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VOLUME XLIII No. 2 Winter 2002

CONTENTS

The Origin of the Baltic-Finns from the Physical Anthropological Point of View
Markku Niskanen 121

Finland's Settling Model Revisited
Milton Nuñez 155

The European Origin of the Finns and their Relation to the Indo-Europeans
Kyösti Julku 177

Book Review Article: National Income, Intelligence, and Climate
Edward M. Miller 213

Book Review: The Blank Slate: The Modern Denial of Human Nature 227

Cover Illustration: Map summarizing Kyösti Julku's view of the direction of initial migration of hunters and gatherers into northern Europe as the ice cap receded toward the end of the Würm glacial period [See article: *The European Origin of the Finns and their Relation to the Indo-Europeans]*

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The Origin of the Baltic-Finns from the Physical Anthropological Point of View

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The author provides a comprehensive analysis of the physical anthropology of the Finns and Saami, comparing them with other Scandinavian peoples and contrasting them genetically with the Mongoloid peoples of Asia, notwithstanding the affinities which link the Finnish language with the Uralic and to a lesser extent the Altaic languages. He concludes that both the Finns and the Saami are genetically Caucasoid or European, and that the Finns especially are closely akin to the other North European peoples of Scandinavia.

Key Words: Finns, Saami, Samoyeds, mitochondrial DNA, nuclear DNA, Y-chromosomal DNA, craniometry, facial index, Caucasoids, Mongoloids.

Introduction

It is impossible to reconstruct the origins of ethnic groups without information about their genetic relationships. This information provides knowledge about inter-population contacts, assists in determining the geographic areas of origins of the populations in question, and sometimes even reveals how long these populations have lived in their present territories. Therefore, these reconstructed genetic relationships can be used to test hypotheses and theories of ethnic origins based on linguistic and/or archeological evidence. In this article, craniometric and nuclear DNA data, as well as the findings of recent studies of mitochondrial DNA and Y-chromosomal DNA variation are used to determine whether the origin of the Baltic-Finns is better explained by the traditional migration theory or by the more recent settlement continuity theory. These two competing theories are reviewed briefly below.

According to the traditional migration theory based primarily on the linguists' family tree model and estimated dates of linguistic divergences, the Finno-Ugrians (the Baltic-Finns and Saami/Lapps) arrived in the Baltic region only about three thousand years ago from the Proto-Uralic homeland in the east (see Häkkinen 1996 for a review). Most researchers locate this homeland in northeastern Europe (Setälä 1926, Korhonen

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1984, Häkkinen 1996), but some in northwestern Siberia (Hajdú 1976, Fodor 1976). Although supported by a minority of the researchers, the Siberian homeland theory is more commonly known than the European one outside the main centers of the uralistic studies.

The Baltic-Finns and Saami are argued to have arrived in their present locations either as a still undifferentiated ethno-linguistic group or as linguistically and ethnically separate people. Supporters of the latter view assume the Saami arrived in Fennoscandia before the Baltic-Finns. The Proto-Baltic-Finns started to separate into different "tribes" with their own languages during the last 2000 years. For example, the separation of the Estonians and Finns would have occurred during the first millennium BC, when the latter moved into Finland (see Häkkinen 1996 for a review).

The continuity theory practically replaced the migration theory in 1980 at the "roots" symposium in Tvärminne, Finland. According to the continuity theory, the Uralic-speakers arrived in the Baltic region either about 6000 years ago with the Typical Comb Ware culture (Meinander 1984, Korhonen 1984), or when the earliest post-Glacial inhabitants of the region arrived about 11,000 years ago (Nuñez 1987, Julku 1995, Wiik 1995, Salo 1996). Supporters of the continuity theory commonly argue that the Uralic-speaking territory extended in the past further west in Central Europe than is traditionally proposed. For example, Kalevi Wiik (this volume) argues that the Finno-Ugric-speaking people lived during the Mesolithic period as far west as the westernmost regions of the North European Plain.

As this article demonstrates, the human biological data (craniometric, nuclear genetic markers, mitochondrian DNA, and Y-chromosomal DNA) supports the continuity theory by showing the Baltic-Finns to have closer genetic affinities with their Scandinavian neighbors than with the eastern Finno-Ugric-speaking populations. Therefore, the genetic ancestors of the Baltic-Finns have lived in the Baltic region more likely for 10,000 years rather than for 3000 years, and more likely arrived from the south than from the east. I will next explain how biological information is used in the reconstruction of the geographic areas of origins of populations and/or ethnic groups.

The Study of Genetic Affinities and Origins

Physical anthropology, the study of human biology, is the

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study of human evolution and biological variation. The latter includes the study of age-, sex, and population-related biological variation. In the past, researchers tried to organize the observed population-related variation by dividing humankind into races. This traditional classificatory approach has been largely abandoned because of several factors: disagreements as to the classification criteria and the number of existing races; difficulties in drawing racial boundaries due to the graded distribution pattern of most biological traits; the lack of objectivity on the part of researchers; and wrong-doings performed in the name of race. However, the study of the geographic distribution of visible "racial" traits, such as skin color, nose shape, hair form, etc., was not entirely wasted effort because this information has helped to discover how such variation has emerged as a result of environmental (especially climatic) selection. Since the 1950s, molecular and population genetic studies have had important roles in physical anthropology, especially in the study of evolution and population-related variation. These molecular anthropological studies have greatly increased our understanding of the origin of genetic variation, the inheritance of biological characteristics, and human evolution itself.

Modern research of human population-related biological variation examines how natural selection (for example, climatic selection), migrations (gene flow), genetic drift (the founders' effect, for example), and mutations effect the genetic structures of populations over generations. Genetic structures of populations can be used to reconstruct their histories and genetic relationships. This reconstruction should ideally be based on different types of biological data because different data reveals information on different aspects and time perspectives of population history. Because all of our biological traits are either direct products of our DNA or results of an interaction between our DNA and the environment, the larger the number of traits studied, the longer segments of DNA are included in analyses. For this reason, I have used craniometric data, allele frequencies of genetic markers found in blood and other tissues (nuclear DNA markers), and the findings of recent mitochondrial DNA and Y-chromosomal DNA studies to reconstruct the origins of the Baltic-Finns.

I have analyzed the craniometric and the nuclear DNA data

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through distance analyses. In addition, the craniometric data is analyzed through discriminant function analyses. Inter-population distances provide a great deal of information about population relationships because they are estimations of the degree of genetic relationships. Also, a distance matrix can be used as an input to construct a dendrogram (a "family" tree diagram) or a plot of multidimensional distance coefficients (as is done in this study). These methods exhibit inter-population relationships visually and, therefore, reveal how populations cluster with each other. In general, neighboring populations usually cluster with each other because long-time inter-population gene flow (exchange of genes) has caused them to become genetically similar. Linguistically related populations are often genetically similar (and cluster with each other) because the origin of the linguistic relationship is either a common geographic area of origin or intensive long-term cultural interactions. Linguistic boundaries are often also genetic boundaries, as Barbujani and Sokal (1990) have demonstrated in the case of Europe, because most people do not marry across linguistic and other cultural boundaries. However, we should not automatically assume that the linguistically-related populations always have the same genetic origin or the linguistically distinct populations have separate origins because languages are inherited through cultural transmission. The old assumptions of the Baltic-Finns and other Uralic-speakers' genetic affinities with the Asian populations are primarily based on the theory that the Uralic-speakers arrived from the east and, therefore, should be genetically distinct from the Indo-Europeans of Europe.

The Old Assumption of the "Mongoloid" Affinities

The widespread assumption that all of the Uralic-speaking people are at least partially "Mongoloid" has its origin in Friedrich Blumenbach's 200-year-old claim that two Saami (Lapp) skulls and one Finnish skull resembled one Mongol skull. The Mongoloid affinity of the Finno-Ugrians was accepted as scientific truth by those who had actually never seen the people in question because Blumenbach was a prominent scientist of his time and the linguists were looking for the Uralic homeland to be somewhere in the east (Kilpeläinen 1985, Kemiläinen 1985, 1993).

Interpretations of findings of physical anthropologists and

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geneticists have been until nowadays strongly influenced by this assumption of eastern affinities of the Finno-Ugrians. For example, Karin Mark (1970) calculated what she calls "Mongolidheitsindex" (Mongoloid-index) from facial features to estimate the proportion of Mongoloid element of Finno-Ugric populations. Also, many prominent geneticists (for example, Guglielmino et al. 1990, Cavalli-Sforza et al. 1994, Piazza et al. 1995) assume that the original homeland of the Uralic people was northwestern Siberia; the ancestral Uralic people were Mongoloids; the Samoyeds are the purest representatives of this ancestral type; ancestors of the Baltic-Finns and the Saami arrived in the west along the Arctic coast and mixed genetically with the Europeans. These researchers (mainly Piazza et al. 1995) consider the Finns, whom they find genetically typical Europeans contrary to this assumption, as an example of a discrepancy between the language and the genes.

These old assumptions are incorrect. In reality, all Finno-Ugrians of Europe (the Baltic-Finns, Saami, Volga-Finns, Permian-Finns, and Hungarians) are phenotypically and genetically typical Europeans. The Ob-Ugrians (Khanty and Mansi) of western Siberia, who are genetically poorly known are phenotypically European-Siberian Mongoloid intermediates. Only the Samoyeds are phenotypically and genetically predominantly Siberian Mongoloids.

The Baltic-Finns and, as a surprise to many people, also the Saami exhibit clearly North European phenotypes. Epicanthic eyefolds, flat faces, coarse straight hair, and other Mongoloid traits are not encountered among them more frequently than among other Europeans (Coon 1939, Brues 1977). Strong cheekbones and flaring zygomatic arches of many Finno-Ugrians, commonly and erroneously assumed to be Mongoloid features, are actually inherited from European Cro-Magnons (Coon 1939, Niskanen 1994b). These two "Paleo-European" features have survived especially well among the Finno-Ugrians of northern Europe because, as the archeological evidence presented by Zvelebil (1986) indicates, the subsistence transition from foraging to farming occurred more recently and with a lesser influx of immigrants in these marginal regions for agriculture than further south. Most other Europeans have been farmers for so many generations (eating soft bread, porridge, etc.) that their cheek bones (which provide attachments for the

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masseter muscle) have reduced in size in comparison to other parts of their facial anatomy.

The light coloring of the Baltic-Finns and Saami reflects their long history of inhabiting northern Europe. North Europeans are the lightest colored people of the world because they have lived in northern latitudes the longest. Therefore, natural selection has had the longest time to produce the light skin color adapted to low levels of ultraviolet radiation. The hair and eye colors are predominantly light because the region's first permanent inhabitants' gene pool (the total of all genes of a population) included by chance a large number of alleles (variants of genes) producing light-colored phenotypes. The light-skinned North Asians do not have light-colored hair and eyes because the first permanent inhabitants of East Asia did not have alleles producing color in their gene pool. Natural selection and founders' effect are, therefore, the most important factors behind the distribution of most biological traits. Sexual selection has had far less influence on the geographic distribution of these traits than most people assume. The mate selection among "natural" populations is based more on ability to procure necessities for life, give birth and raise children, and create and maintain alliances between groups and families than on particular physical traits, such as eye color or nasal profile. Due to these reasons, most marriages are arranged in many societies because the mate selection was considered too important to be left to the young in question.

The Degree of Facial Flatness and Frequencies of Eastern Genetic Markers

All human populations are linked to other human populations through at least indirect gene flow. As a result, most biological traits have graded geographical distribution and there have never been pure races. Some human populations are, however, results of an admixture of two or more genetically fairly distinct populations. For example, the Finno-Ugrians of Europe are commonly assumed to have originated from the genetic admixture of European and Siberian populations. To estimate the degree of this assumed admixture, Karin Mark (1970) calculated a *Mongolidheitsindex* (Mongoloid-index) from facial traits of living people. I followed her example and calculated "Mongol-indices" from four indices of facial flatness (DKI, NDI, SII, and SSI) computed from measurements of the

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facial skeleton. These measurements and indices are presented in Niskanen (1994b). Table 1 lists sources of the cranial data used. I use the term Mongol-index because the Mongols are among the most flat-faced and, therefore, "Mongoloid-looking" people. At first, I computed index-specific values so that the value indicating the most extreme facial flatness equals 100 and then averaged these values. The higher the Mongol-index, the flatter and, therefore, the more "Mongoloid" the face (Table 2).

Gene-frequency data allows more accurate estimations of genetic admixture than morphological data. Nevanlinna (1978) estimated from nuclear genetic markers (blood groups) that 20-30% of the Finns' genes originated from the east (Siberia) and the rest originated from the west (Western Europe). He did not provide genetic admixture estimations for other Europeans, which resulted in a common misunderstanding that the Finns are a mixture of Europeans and Asians while their neighbors are "pure" Europeans. As will be pointed out by the "Oriental-indices" discussed below, the 20-30% eastern component of the Finnish gene pool is average for the Europeans.

Guglielmino et al. (1990) estimated from nuclear genetic markers the Finns to be genetically 10.1% Uralic (Samoyeds were used as the Uralic reference population) and 89.9% European, while the Saami were 47.5% Uralic and 52.5% European. Cavalli-Sforza et al. (1994:273) estimated the Saami to be 18% Samoyed (and 82 % European) from genetic distances between the Danes (used as the European reference population), and the Saami (considered as an admixed population), and Samoyeds. However, these very distances reveal that the Saami are genetically further removed from the Samoyeds (F_{ST} = 857.3) than the Danes are (F_{ST} = 828.5), making it more appropriate to consider the Saami 100% Europeans and the Danes an admixed European-Samoyed population. A re-calculation makes the Danes 21.2% Samoyedic (and 78.8% European), while the Saami would be 100% European. Unfortunately, Cavalli-Sforza et al. (1994) did not estimate the Samoyed genetic component of the Finns and other non-Saami Europeans, nor did they provide genetic distances between the Finns and the Samoyeds from which to calculate the Samoyed genetic contribution in the Finnish gene pool.

I used a simple genetic admixture estimation I call the "Oriental-index" to estimate relative western and eastern genetic

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Sample	*N*	*Collection*
British	90	1,2
Norwegian	55	7
Swedish	96	4,5,6
Finnish	109	1,3,4
Saami	29	3
Mordva	10	3
French	28	1,4
German	28	1,4,5
Austria	61	4,7
Czech	28	1,3,4
Russian	30	1,3,4
Burjat	55	7

Table 1. Cranial samples used in this study. The N figure indicates sample sizes, and the figure for collection refers to collections where the specimens are housed, and or/individuals who provided the data.

1. Department of Palaeontology, British Museum (Natural History), London, U.K.; courtesy of Dr. C.B. Stringer.
2. Duckworth Laboratory, University of Cambridge, Cambridge, Cambridge, U.K.; courtesy of Dr. R. Foley.
3. Department of Anatomy, University of Helsinki, Helsinki, Finland; courtesy of Prof. I. Virtanen.
4. Osteologiska Laboratoriet, Stockholm Universitet, Solna, Sweden; courtesy of Prof. T. Sjovold.
5. Anatomiska Department, Lunds Universitet, Lund, Sweden; courtesy of Prof. G. Forsberg.
6. Historiska Museet, Lund, Sweden; courtesy of Dr. E. Iregren
7. Provided by Prof. William Howells (Peabody Museum, Harvard University).

I have also used sample means of other populations from Howells (1989). More detailed information about the craniometric data and craniometric measurements used in this study is provided by Niskanen (1994b).

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Population	*Mongol-index*	*Oriental-index*
Europe (av.)	24.9	22.8
Basque	–	12.4
French	22.4	18.3
German	16.7	19.6
Austria	32.4	20.7
Czech	25.4	16.7
Russia	25.4	21.6
Greek	–	33.4
British	12.9	20.7
Norwegian	28.0	20.5
Swedish	20.4	18.2
Finnish	25.4	25.1
Saami	25.5	42.2
Komi	–	30.1
Mari	–	34.2
Mordvian	39.4	–
Hungarian	–	21.4
Samoyed	–	58.0
Caucasus	–	35.6
Near Eastern	–	32.1
Indian	–	55.40
Mongolian	–	74.9
Buryat	90.0	73.4
Korean	–	78.6
Japanese	69.2	87.5
Ainu	52.0	92.8
South-Chinese	67.8	82.3
Tibetan	–	81.4

Table 2. Mongol- and Oriental-indices. British are pooled Irish, Scottish, and English. The European average Mongol-index is the average of the European populations for which this index is calculated. The European average Oriental-index is the index value calculated using the average allele frequencies of all European populations.

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components of Eurasian populations. This index is computed from allele frequencies of six genetic loci (Fy, Esd, Glo1, Hp, P1, Rh) collected from literature (Nevanlinna 1973, Kajanoja 1978, Zubow 1979, Eriksson 1988, Heapost 1993, and Cavalli-Sforza et al. 1994). These genes have clear west-east gradients in Eurasia. First, I calculated allele-specific values (the most eastern value equals 100 and western equals 0) and then averaged them. The resulting Oriental-index is the eastern genetic component in the gene pool. The Mongol- and Oriental-indices are listed in Table 2.

An examination of average Mongol-index values reveals that they increase toward the east. The inhabitants of the British Isles (12.9%) have the sharpest facial profiles and the Buryats (90.0%) of the Lake Baikal region have the flattest faces. The Volga-Finnic-speaking Mordvians (39.4%) and Austrians (32.4%) have the flattest faces in Europe, but the Finns (25.4%) and the Saami (25.5%) are close to the European average (24.9%). The Ainu (52.0%) have the least amount of facial flatness among the Asians, although their faces are considerably flatter than those of European populations. Moderate facial flatness may be an ancient feature of inhabitants of the Pacific coast of Asia because the Polynesians originating from this region are not particularly flat-faced either. It appears that the extreme facial flatness of the classic Mongoloid people originated in the inland of northeastern Asia.

The Oriental-index values also increase toward the east. The Basques are genetically the most western (12.4%) and the Ainu are the most eastern (92.8%). Therefore, the Ainu cannot have an ancient Caucasoid origin, regardless of their relatively sharply profiled faces. The Finns (25.1%) are quite average by European standards (European average is 22.8%) and genetically less eastern than the Greeks (33.4%), Saami (42.2%), Permian-Finnic-speaking Komi (30.1%), and Volga-Finnic-speaking Mari (34.1%). The relatively high Oriental-index of the Saami (42.2%) is much higher than their admixture estimation (18%) based on genetic distances by Cavalli-Sforza et al. (1994), therefore, it is most likely a result of the markers used. The indices of the Komi and Mari have probably increased during the last 1,500 years due to the westward expansion of the Turks. The Samoyeds' Oriental-index (58.0%) reflects their Northwest Asian geographic location and

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both western and eastern genetic ancestors.

These indices reveal that the relative eastern components (especially the Oriental-index) increase slowly from the Atlantic to the Ural, but rapidly east of the Urals; the Finns (representing the Baltic-Finns) are typical Europeans; not a single Eurasian population is morphologically and genetically 100% western or eastern; the Mongol- and Oriental indices correspond roughly. This rough correspondence is the result of random genetic drift. According to the fossil evidence, the first permanent inhabitants of Europe had sharply profiled faces and those of East Asia had flat faces. Descendants of these founders inherited these facial features independently from genetic traits used to calculate the Oriental-index values.

It is worth noting that the Finno-Ugrians of easternmost Europe are quite typical Europeans (see Liptak 1980) although they (especially the Komi) are the immediate western neighbors of the Nenets Samoyeds, who exhibit predominantly Mongoloid phenotypes and eastern genetic traits. This finding indicates that the genetic roots and, therefore, areas of origins of all the Finno-Ugrians of Europe were in Europe.

Craniometric Analyses

I used the SAS-package to compute Mahalanobis distances between cranial samples. I used measurement batteries: B39 (35 measurements and 4 indices) and B96 (96 measurements) to calculate Mahalanobis distances and the measurement battery B42 (42 measurements) to extract canonical discriminant function scores. The raw measurements were standardized for size by using W. Howells' c-score method (Howells 1989) and indices were standardized by converting them to z-scores before analyses. Most of the craniometric data used was collected by myself (Niskanen 1994b), although data kindly provided by William Howells is also used. The craniometric samples are listed in Table 1. The Finns represent the Baltic-Finns in these analyses. I have also compared recent European cranial samples with Upper Paleolithic cranial specimens (Cro-Magnon 1, Predmost III, Pavlov I, Obercassel I, Chancelade I, and Cheddar I) through canonical discriminant function analyses.

I used 39 craniofacial measurements and indices (listed in Niskanen 1994a) to calculate Mahalanobis distances between the European cranial samples and the Buryats of the Lake Baikal region (Table 3). These distance-values reveal how similar

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(small values) or distant (large values) populations in question are from each other. An examination of these distances reveals that the Finns (and presumably other Finno-Ugrians as well) and the Saami do not possess more similar craniofacial configurations with the Buryats than is typical for the Europeans.

Although 39 craniofacial variables provides accurate information of craniofacial affinities of distantly related populations, a larger number of variables is needed to gain reliable information of population relationships of closely related and, therefore, craniofacially similar populations (Niskanen 1994b). For this reason, I also computed craniometric distances by using 96 craniofacial measurements (listed in Niskanen 1994b) to determine the craniometric relationships of the Europeans (Table 4). Unfortunately, I was unable to include the Norwegians, Austrians, and the Buryats measured by Howells due to lack of measurement values. These distances reveal that the Finns are craniometrically very close tothe Swedes and the Russians (mostly from northwestern Russia), and the least distant population from the craniometrically distinct Saami.

I used the multidimensional scaling (MDS) procedure of SAS to construct a two-dimensional picture of the European populations' craniometric relationships. The MDS procedure is a better method than the frequently used tree-diagram because it constructs a kind of map of population relationships. I used the craniometric distances of Table 3 as input because I wanted to include the Norwegians and Austrians. I did not include the Buryats because their inclusions would have pushed all Europeans to the opposite side of the plot, distorting their distances from each other (Niskanen 1994a: Fig.1). Figure 1 (a mirror image of the diagram produced by Proc MDS of SAS) demonstrates that a plot of two dimension coefficients extracted from distances between the European cranial samples places these samples almost exactly where one would place them according to their geographic locations. The Finns are placed between the Swedes and the Russians, and the Swedes are placed between the Norwegians and the Finns. The Saami are placed well apart from other Europeans, but the least apart from the Finns and the Russians.

The craniometric relationships of populations can also be

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POP	*BRI*	*NOR*	*SWE*	*FIN*	*SAA*	*FRE*	*GER*	*AUS*	*CZE*	*RUS*	*BUR*
BRI	–	69	37	60	149	40	46	93	100	70	511
NOR	69	–	35	64	168	96	101	77	189	103	368
SWE	37	35	–	40	126	65	69	83	138	65	413
FIN	60	64	40	–	98	54	56	72	87	42	369
SAA	149	168	126	98	–	123	107	146	159	91	365
FRE	40	96	65	54	123	–	30	65	48	49	454
GER	46	101	69	56	107	30	–	55	59	41	408
AUS	93	77	83	72	146	65	55	–	92	58	324
CZE	100	189	138	87	159	48	59	92	–	49	477
RUS	70	103	65	42	91	49	41	58	49	–	335
BUR	511	368	413	369	365	454	408	324	477	335	–

TABLE 3. Craniometric (Mahalanobis) distances (x 10) between European populations and the Buryats of the Lake Baikal region computed by using 39 craniofacial measurements and indices. BRI = British (pooled Irish, Scottish, and English), NOR = Norwegians, SWE = Swedish, FIN = Finnish, SAA = Saami, FRE = French, GER = German, AUS = Austria, CZE = Czech, RUS = Russian, and BUR = Buryat. See Niskanen (1994a) for variables and their definitions.

POP	*BRI*	*SWE*	*FIN*	*SAA*	*FRE*	*GER*	*CZE*	*RUS*
BRI	–	82	122	317	102	95	175	140
SWE	82	–	96	295	164	151	222	141
FIN	122	96	–	196	185	133	169	96
SAA	317	295	196	–	363	292	334	267
FRE	102	164	185	363	–	103	145	149
GER	95	151	133	292	103	–	119	111
CZE	175	222	169	334	145	119	–	120
RUS	140	141	96	267	149	111	120	–

Table 4. Craniometric (Mahalanobis) distances (x10) between northern and central European cranial samples calculated from c-scores of 96 cranial measurements. BRI = British (pooled English, Scottish, and Irish), SWE = Swedish, FIN = Finnish, SAA = Saami, FRE = French, GER = German, CZE = Czech, and RUS = Russian. See Niskanen (1994b) for variables and their definitions.

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examined with the help of the canonical discriminant analyses. Figure 2 presents scores of the first (x-axis) and the second (y-axis) canonical discriminant functions computed using the SPSS-program from c-scores of 42 cranial measurements. The cranial populations are clustered almost as one would expect in light of their geographic relationships. This diagram also demonstrates that the North Europeans (the Finns, Saami, and Swedes) have diverged craniometrically the least from the Cro-Magnons of Europe. This is expected because the transition from hunting to farming occurred both late and without large-scale population movements in Northern Europe. In Southern and Central Europe, this subsistence transition occurred earlier and largely as a result of demic diffusion of farmers of ultimately Near Eastern and/or Balkan extraction. As a result, their cranial configuration has changed more.

These craniometric analyses demonstrate that the Finns (and presumably other Baltic-Finns) and Saami (although they form their own subset within the European set) possess North European craniofacial configuration with more than average amount of Paleo-European (Cro-Magnoid) features. This finding indicates that the Baltic-Finns and Saami (as well as their Scandinavian neighbors) are indigenous people of northern Europe and not recent immigrants from elsewhere (Niskanen 1998).

Genetic Relationships in Light of Nuclear Gene-Frequency Evidence

I used the Chi-Square distance measure of the SPSS-program to calculate genetic distances between populations from the nuclear gene-frequencies. The raw data is collected from literature (Nevanlinna 1973, Kajanoja 1978, Zubow 1979, Eriksson 1988, Heapost 1993, Cavalli-Sforza et al. 1994). The use of this distance measure does not tolerate missing values. For this reason, I had to vary the markers used depending on which populations were compared and, therefore, the distance values computed using different sets of markers are not comparable. In general, the larger the number of genetic markers used, the more reliable the genetic distance.

The Finns and the Estonians represent the Baltic-Finns in these analyses. The Finns represent the Baltic-Finns when large numbers of genetic markers are needed. I had to pool the Mari and the Komi to represent the Finno-Ugrians of the easternmost

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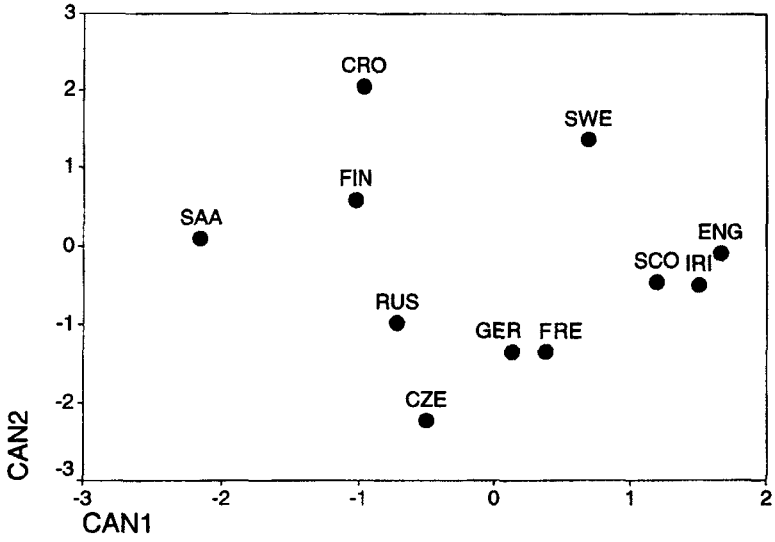

Figure 1. A mirror image of dimension coefficient plot extracted from Mahalanobis distances between the European samples of Table 3 using the MDS-procedure. BRI = British (pooled English, Scottish, and Irish), NOR = Norwegian, SWE = Swedish, FIN = Finnish, SAA = Saami, GER = German, FRE = French, CZE = Czech, and RUS = Russian. Modified from Niskanen (1994a).

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Europe (EFU = Eastern Finno-Ugrians) due to insufficient gene-frequency data.

At first, I calculated the genetic Chi-Square distances of European populations from the Finns, Saami, the European average, inhabitants of modern Turkey (Anatolia), Mongols, and Japanese to determine how these populations are placed within the genetic landscape of Eurasia (Table 5). These distances reveal that the Finns are genetically close to their Germanic-speaking neighbors (the Swedes, Germans, and Norwegians), the least distant population from the Saami, and no more distant from the European average than are the Irish and the Basque. Based on the F_{ST} genetic distances presented by Cavalli-Sforza et al. (1994:270), the Finns are genetically a little closer to the Belgians (F_{ST} = 63), Germans (F_{ST} = 77), and Austrians (F_{ST} = 77) than to the Swedes (F_{ST} = 82). This difference is a result of Cavalli-Sforza et al. (1994) using a different genetic distance measure and computing distances using a data set including missing values. As Nei and Roychoudhury (1993) have pointed out, inter-group distances can be misleading if the data set from where the distances are computed includes missing values.

The genetic distances to the inhabitants of modern Turkey (Anatolia) indicate that the Finns are just like other North Europeans genetically more distant from the Near Eastern people than are the Central-and South Europeans. The genetic distances to the Mongols and the Japanese indicate that the Finns are genetically somewhat less distant to these eastern populations than the Europeans are as an average, but not any closer than other Europeans living along the same longitude (for example, the Greeks and Bulgarians in respect to their distances to the Japanese). Many allele frequencies of the Finns and especially the Saami, which differ from the European averages, and the surprisingly small genetic distance off the Icelanders from the Mongols (which is smaller than that between the Finns and the Mongols) are most likely results of random genetic drift in partially isolated and numerically small population.

The F_{ST} distances (above the diagonal) and Chi-Square distances (below the diagonal) were used to examine the genetic relationships of the Finns with other North European populations more closely (Table 6). These two genetic distance

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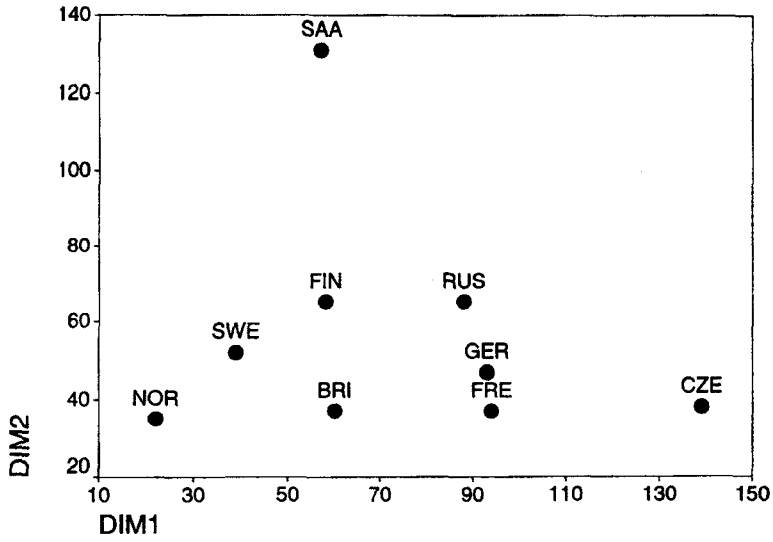

Figure 2. Plot of sample means of the first (CAN1) and the second (CAN2) canonical discriminant function scores computed from c-scores of 42 craniofacial measurements. These two scores explain 70.04% of the total variance. CRO = Cro-Magnons, IRI = Irish, SCO = Scottish, ENG = English, SWE = Swedish, FIN = Finnish, SAA = Saami, GER = German, FRE = French, CZE = Czech, and RUS = Russian. This is the same set of variables than the one used to calculate Mahalanobis distances of Table 3 except that none of the raw measurements were used to compute indices.

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measures provide very similar pictures of the inter-population genetic relationships. Based on these distances, the Swedes are the least distant from the Finns. The F_{ST} and Chi-Square distances between the Finns and the Swedes (82 and 156) are, however, considerably larger than the distances of the Swedes to the Norwegians (18 and 84), Danes (36 and 98), Dutch (41 and 118), and English (37 and 123), but about equal to those of the Swedes to the Irish (94 and 192) and Scottish (74 and 157). This finding indicates either that the Baltic Sea has formed a partial restriction of gene flow and, therefore, a genetic boundary, or that the Northwest Europeans and the Northeast Europeans have partly different genetic origins. The relatively large geneticdistances between the Finns and other Northwest Europeans could also have resulted from genetic drift, which has altered the Finns' allele frequencies.

The genetic distances of the Finns to the Saami are smaller than those between the Saami and other European, but still very large. This finding indicates that the Finns and the Saami were originally more distant from each other, but have exchanged genes during the more recent history. In other words, it appears that these two Finno-Ugrian-speaking people most likely do not descend from a common ancestral population which lived only 4,000-5,000 years ago. The same conclusion has also been reached in light of the mitochondrial DNA evidence discussed below.

I computed genetic Chi-Square distances between the Irish, Swedes, Finns, Saami, pooled Mari and Komi (EFU = Eastern Finno-Ugrians), Samoyeds (Nenets and Nganasans), and Mongols to estimate the genetic relationships between the Uralic-speaking populations and their non-Uralic-speaking neighbors. Based on these distances (Table 7), the Finns representing the Baltic-Finns are genetically closer to both the Swedes (99) and the Irish (136) than to the pooled Mari and Komi (142). Interestingly, the genetic distance between the Finns and the Irish (136) is not much smaller than the distance between the Irish and the pooled Mari and Komi (159) regardless of the geographic distances between the groups in question.

The genetic distances in Table 7 also reveal that the Finns, Saami, and the pooled Mari and Komi (EFU) to the Samoyeds (Nenets and Nganasans) are not much smaller than those of the

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POP	*FINNISH*	*SAAMI*	*EUROPEAN*	*ANATOLIAN*	*MONGOL*	*JAPANESE*
Irish	262	400	176	260	393	501
Scottish	234	315	145	242	389	496
English	196	292	92	207	375	475
Dutch	182	278	100	215	386	481
Danish	171	279	102	221	376	481
Norwegian	166	266	117	229	378	471
Swedish	156	241	143	236	383	474
Finnish	–	225	160	215	363	441
Saami	225	–	280	305	379	454
Icelandic	193	282	149	252	354	466
Belgian	172	282	80	189	374	471
French	203	302	84	176	387	470
German	160	274	60	183	370	464
Austrian	174	296	52	169	376	464
Swiss	179	291	70	181	379	475
Czech	182	316	103	187	376	466
Polish	189	302	129	207	373	458
Russian	208	320	130	206	379	466
Hungarian	172	292	86	176	360	453
Basque	281	368	191	256	435	519
Spanish	233	337	107	162	388	466
Portuguese	222	315	120	189	398	475
Italian	185	304	73	137	372	454
Greek	200	305	145	159	372	433
Bulgarian	202	314	145	150	381	443
Romanian	177	299	108	156	385	455
Yugoslavian	171	292	96	191	375	469

Table 5. The genetic Chi-Square distances (X 10) of the European populations from the *Finns, Saami, Europeans' gene-frequency averages (Eurpean), Anatolians (inhabitants of* the modern Turkey), Mongols, and Japanese. Distances are computed from allele frequencies of the following genetic loci and systems: ABO,ACP1, AK1, ADA, CDE, ESD, FY, GC, GLO1, HLA-A, HLA-B, HP, IGHG, JK, KEL, MNS, PTC, PGD, PGM1, and TF.

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POP	*IRI*	*SCO*	*ENG*	*DUT*	*DAN*	*NOR*	*SWE*	*FIN*	*SAA*
IRI	–	29	30	76	68	79	94	223	570
SCO	111	–	27	48	40	58	74	66	447
ENG	123	87	–	17	21	25	37	115	405
DUT	163	124	75	–	9	21	41	123	341
DAN	166	119	73	66	–	19	36	96	334
NOR	170	127	85	81	64	–	18	94	317
SWE	192	157	123	118	98	84	–	82	333
FIN	262	234	196	182	171	166	156	–	210
SAA	340	315	292	278	279	266	241	225	–

Table 6. Genetic FST (above the diagonal) and Chi-Square (below the diagonal) distances between North European populations. The FST distances (x 10,000) are from Cavalli-Sforza et al. (1994:270). The Chi-Square distances (x 10) are computed from allele frequencies of genetic systems and loci listed in Table 4. IRI = Irish, SCO = Scottish, ENG = English, DUT = Dutch, DAN = Danish, NOR = Norwegian, SWE = Swedish, FIN = Finnish, and SAA = Saami.

POP	*IRI*	*SWE*	*FIN*	*SAA*	*EFU*	*NEN*	*NGA*	*MON*
IRI	–	116	136	273	159	340	392	338
SWE	116	–	99	236	147	341	400	337
FIN	136	99	–	226	142	302	375	298
SAA	273	236	226	–	248	353	409	339
EFU	159	147	142	248	–	295	365	292
NEN	340	341	302	353	295	–	215	148
NGA	391	400	375	409	365	215	–	248
MON	338	337	298	339	292	148	248	–

Table 7. Chi-Square distances (x10 and rounded up without decimals) between the Irish (IRI), Swedish (SWE), Finnish (FIN), Saami (SAA), pooled Mari and Komi (EFU = Eastern Finno-Ugrians), Nenets Samoyeds (NEN) and Nganasan Samoyeds (NGA), and Mongols (MON). Distances are computed by using allele frequencies of the following genetic systems and loci: ABO, ACP1, ADA, AK1, FY, DI, GLO1, GC, HP, KEL, JK, MNS, P1, PGM1, PGD, SE, TF, CDE, and IGHG.

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POP	*EST*	*FIN*	*SWE*	*EFU*	*SAA*
EST	–	118	144	146	271
FIN	118	–	116	149	219
SWE	144	116	–	164	236
EFU	146	149	164	–	258
SAA	271	219	236	258	–

Table 8. Chi-Square distances (x10 and rounded up without decimals) between the Estonians (EST), Finns (FIN), Saami (SAA), the pooled Mari and Komi (EFU), and Swedes (SWE). Distances are computed from allele frequencies of the following genetic systems and loci: ABO, DI, FY, GC, HP, KEL, LE, LU, MNS, P1, PTC, CDE, SOD, TF, the subtypes of TF, LW, and UL.

Irish and the Swedes to the Samoyeds. The Samoyeds are also genetically equally distant from the Europeans (both Uralic- and non-Uralic speakers) than are the Mongols. These findings demonstrate clearly European gene pools of even the easternmost Finno-Ugrians and North Asian gene pools of the Samoyeds. It is clear that the ancestors of the Finno-Ugrians and the Samoyeds either diverged a very long time ago from each other (tens of thousands of years ago) or that there never was a common Uralic homeland. A study of the Samoyeds' Y-chromosomal DNA variation by Karafet et al. (1997) supports the idea of distinct genetic and geographic origins for the Samoyeds and other Uralic-speaking populations.

I had to reduce the number of genetic markers used to include the Estonians in the genetic distance analyses. Results presented in Table 8 are, however, similar to those presented above. The Baltic-Finns (the Estonians and Finns) are genetically somewhat closer to the Swedes (144 and 116) than to the pooled Mari and Komi (146 and 149). This finding indicates that the Baltic-Finns and the more eastern Finno-Ugrians do not have recent common ancestors who lived only about 3,000 years ago between the Volga River and the Ural Mountains, as argued in the traditional migration theory. If these groups had a common homeland, they must have diverged from each other over ten thousand years ago instead of 3,000 years ago. The genetic distances presented also demonstrate that the Finns are genetically closer to the Swedes (116) than to the Estonians (118), indicating that the Finns and the Estonians probably diverged from each other (through the migration of the Finns'

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ancestors from Estonia) earlier than the traditionally assumed migration date (during the first millennium AD).

The Mitochondrial DNA and Y-Chromosomal DNA Evidence

The mitochondrial DNA (mtDNA) is inherited matrilineally, whereas the Y-chromosomal DNA is inherited patrilineally. This lack of genetic recombination allows reconstructions of maternal lineages (from the mtDNA data) and the paternal lineages (from the Y-chromosomal data) from the DNA sequence differences. This data also provides information about more ancient population history than the nuclear gene frequencies (of blood groups and enzyme polymorphism), which can change markedly through genetic bottlenecks (genetic drift).

The mtDNA studies (Sajantila et al. 1995, Lahermo et al. 1996) reveal that the non-Saami Finno-Ugrians of Europe (the Finns, Karelians, Estonians, Volga-Finns) have the same genetic origin as the non-Uralic-speaking Europeans, and that the Saami represent a unique and ancient sub-group of Europeans that had separated from the other Europeans over 10,000 years ago. Therefore, the Baltic-Finns (the Finns, Karelians, and Estonians) and the Saami do not appear to descend from a common ancestral population that lived as recently as a few thousand years ago. The genetic admixture between the Baltic-Finns and the Saami is also rather recent, but adequate enough to make the Finns and the Karelians the closest genetic relatives of the Saami.

Studies of the mtDNA and Y chromosomal DNA reveal information about ancient population movements and directions. For instance, the distribution and diversity of the mtDNA haplogroup V indicates a population expansion from Southwest Europe starting about 15,000 years ago over the western half of Central Europe and the entire Northwest Europe. The existence of this haplogroup among the Saami, Baltic-Finns, and the Volga-Finns indicates a sizeable ancient West European genetic component in their gene pools. Its frequency is the highest among the Saami (40.9%), Basque (20.0%), and Catalonians (26.7%). It exhibits the greatest amount of diversity among the Iberian populations, suggesting that this region is its most likely area of origins. This diversity is far less among the Saami, indicating that their extremely high

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haplogroup V frequencies resulted from founders' effect (Torroni et al. 1998).

While studies of the mtDNA variation indicate strongly the western maternal gene pools of Europe's Finno-Ugrians, the studies of Y-chromosomal DNA variation indicate eastern paternal genetic contribution in their gene pools in addition to the western one. Kittles et al. (1998) noted significant differences in Y chomosome haplotype variation between western and eastern Finland. They thought that the western Finns, characterized by the haplotype B, were of predominantly western ancestry and that the eastern Finns, characterized by the haplotype A, were of Asian ancestry because the haplotype A contains the DYF155S2 deletion found most commonly among Asians. According to Jobling et al. (1996), this deletion is, however, also encountered among the Norwegians and Greeks, and it is the most common in Finland and Mongolia. Therefore, I argue this deletion could have emerged anywhere between Scandinavia and Mongolia, making it a possible genetic marker of a late Ice Age population expansion from the South Russian Plain from where the Northeast Europe and Northwest Asia were colonized after the Last Glacial Maximum.

Zerjal et al. (1997) argued that the C allele on the Y chromosome of some North Europeans and North Asians emerged in Asia and spread to North Europe, where its existence indicates a considerable paternal genetic contribution of North Asians to North European populations, especially the Finno-Ugrians. Villems et al. (1998) discovered that this allele exhibits more variation among Europeans than among Asians and, therefore, they suggested that it originally emerged among Proto-Finno-Ugric populations of Eastern Europe from where it spread to some Siberian populations. I consider this C allele as the genetic marker of the late Ice Age (after the Last Glacial Maximum) population expansion from the South Russian Plain.

A study of Y-chromosomal markers indicate that the Samoyeds are descendants of Paleoasiatic populations which were (linguistically) assimilated by populations who came from southern Siberia (Karafet et al. 1997). This finding explains the phenotypic and genetic distinctness of the Samoyeds from other Uralic-speaking people and similarity with more eastern people, as well as contradicts the assumption that the Samoyeds are genetically the closest to the ancestral Uralic people.

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All of this craniometric, nuclear DNA, mtDNA, and Y-chromosomal DNA information indicates that the Finno-Ugrians of Europe originated in Europe, the Baltic-Finns are genetically closer to the Scandinavians than to the Finno-Ugrian people in the east, the Saami form a distinct subset within the Europeans, and the Samoyeds have a distinct genetic origin from other Uralic people. I will next discuss these findings in light of the archeological evidence of population history.

The Genetic Origins and the Archaeological Evidence

Genetic relationships are results of a long history of population events. These events cannot be reconstructed accurately without information about the prehistory and history of the populations in question. In case of northern Eurasia, we have to reconstruct the population events at least since the Last Glacial Maximum (23,000-19,500 BC), after which the entire northern Eurasia was colonized. North Europe was colonized primarily from two of the Last Glacial Maximum refugia areas: the Franco-Cantabria in the west and the South Russian Plain (mainly the Dnieper-Don region). These two refugia areas were separated from each other by a most likely uninhabited isthmus located between the Fennoscandian and Alpine glaciers, although there were some settlements in eastern Austria and western Hungary. West Siberia and Central Asia (except southern Urals) were either uninhabited or sparsely inhabited because West Siberia was almost entirely covered by an enormous inland lake, and the region between the Caspian Sea and the mountains of Central Asia was a dry and inhospitable desert. The upper Yenisey and the Lake Baikal regions were, however, inhabited, as was the entire southeastern half of Siberia (Soffer 1990).

Human settlement started to spread over northern Eurasia when the climate started to ameliorate around 19,500 BC. Groups originating from Franco-Cantabria settled the British Isles and the North European Plain located west of the Vistula River (Creswellian/Hamburg cultures) and the Central European hill region between the Atlantic Ocean and the Carpathian Mountains (Magdalenian culture). Groups originating from the Dnieper-Don region (for example, Swiderian culture) settled the entire northeastern Europe located east of the Oder River and possibly westernmost Siberia

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(Dolukhanov 1986, 1993, Soffer 1990, Schild 1996). The mtDNA haplogroup V is the genetic marker of the colonization of Northwest Europe from Franco-Cantabria (Torroni et al. 1998) and the Y-chromosomal C allele is the genetic marker of the colonization of Northeast Europe and West Siberia from the South Russian Plain (Zerjal et al. 1997, Villems et al. 1998).

The Dnieper-Don region of the South Russian Plain is the only candidate for a region from where the entire distribution area of the Uralic languages was settled. The two competing traditional Uralic homelands – the northeastern corner of Europe between the Volga Bend and the Urals and Northwest Siberia – received their first permanent human settlement from this region. Northwest Siberia also received settlers from further east of Siberia. It is, therefore, possible that the late Upper Paleolithic period inhabitants of the entire Northeast Europe and West Siberia spoke ancestral dialects of the Uralic languages (Nuñez 1987, Julku 1995). These groups could have maintained their linguistic affinities through cultural contacts (marriage exogamy, etc.) facilitated by the extensive river network of this huge territory (see Fig. 7 in Nuñez 1987:14).

There is one problem with the idea that the South Russian Plain was the Uralic homeland. According to Mallory (1989), for example, it was possibly settled by Proto-Indo-Europeans already during the Mesolithic period. A solution to this problem could be the late Ice-Age northward displacement of ecological zones and human populations adapted to these zones. The individual group territories became at first stretched in a north-south direction, making the seasonal migrations between the northern and southern parts of hunting territories gradually too long, which resulted in abandonment of the southernmost territories. Groups speaking ancestral dialects to Proto-Indo-Iranian could have expanded into territories being gradually vacated by speakers of Proto-Uralic dialects through the same process, either from the northeastern Balkans or the Kuban region east of the Black Sea.

The earliest post-Last Glacial Maximum inhabitants of the southeastern shores of the Baltic Sea belonged to the Late Upper Paleolithic Swiderian culture (10,800-9700 BP / 9800-8700 cal BC), which descended from the East Gravettian cultures of the South Russian Plain. This culture spread to the Oder River in the west (Schild 1996). If people of the Swiderian

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culture spoke a Proto-Uralic language, the Oder River formed the westernmost boundary of the Uralic language at the end of the Paleolithic period.

Whether or not the people of the Swiderian culture were Proto-Uralic-speakers, the most ancient human settlement of the region historically inhabited by the Baltic-Finns belonged to the Early Mesolithic Kunda culture (emerged about 8700 BC), the roots of which are in the Swiderian culture. Finland received her first permanent settlers from the Kunda culture's territory in the south (Estonia) and east (Karelia) about 8500 BC. When these possibly Proto-Uralic-speaking groups arrived in northern Finland around 8000 BC, they met coastal groups, who had arrived in northern Fennoscandia as early as 9000 BC from then ice-free region between the British Isles and Denmark by following the ice-free coast of Norway. At that time, the inland regions of central and northern Scandinavia were still covered by ice (Nuñez 1987, this volume). The coastal people may have become Uralic-speaking Saami as a result of cultural contacts with Proto-Uralic-speaking populations inhabiting inland regions of northern Fennoscandia. This language shift would explain why the Saami are genetically so distinct from Scandinavians and Baltic-Finns, but speak languages that are quite similar to the Baltic-Finnish languages. A similar language change apparently occurred in Western Siberia where the Paleo-Asiatic inhabitants were linguistically assimilated by the Uralic-speakers, giving origins to the Samoyeds.

The introduction of food production changed the linguistic and genetic landscape of the Old World. Colin Renfrew (1987, 1992) has proposed that this subsistence shift was associated with the spread of Indo-European languages from Anatolia over most of Europe. Cavalli-Sforza et al. (1994) have demonstrated with synthetic maps of principal component scores computed from gene-frequency data that there was a population expansion (demic diffusion) from Anatolia into Europe, which made especially Southern- and Central Europeans genetically closer to the Near Eastern populations. The archeological evidence (for example, in Zvelebil 1986) indicates that the spread of farming into northern Europe was slower and took place primarily through cultural diffusion. As a result, North European gene pools received less Near Eastern genes than those of Central- and Southern Europeans and the non-Indo-European languages

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survived longer. The early historical period Pictish language of Scotland and the Finno-Ugric languages of northern and eastern Europe represent remnants of indigenous North European languages.

The earliest farming in the East Baltic region dates to the Corded Ware (Battle/Boat Axe) period (3200-2500 cal. BC) (Lang 1998). The spread of this culture over this region must have had a significant impact on the ethnogenesis of the Baltic-Finns. For instance, the Baltic-Finnic protolanguage is thought to have received its Baltic loan words as a result of this event. Central European genes arrived also. Sajantila and Pääbo (1995) have even proposed that the Indo-European-speaking Battle Axe people became linguistically assimilated by the indigenous Uralic-speaking people (Lapps/Saami) in Finland. This theory is based on observations that the Finns are genetically rather lingistically European, while the Saami are very distinct.

Sajantila and Pääbo's (1995) theory has three problems. First, it is unlikely for numerically superior intruders with a more complex social organization to become linguistically assimilated by numerically inferior indigenous people with a simpler social organization. Second, the Estonians and the Livs, living south of the Gulf of Finland, are Finno-Ugrians, although there have never been Lapps in these regions who could have linguistically assimilated the Indo-Europeans. Third, the so-called Lapps who lived in southern and central Finland during the Middle Ages may have been genetically similar to the modern Finns and distinct from the modern Saami of northern Fennoscandia. For these reasons, I consider it more likely that the Battle-Axe people who arrived in Finland spoke a Proto-Baltic-Finnish language (Uralic language influenced by Proto-Baltic languages) and that they were not markedly different genetically from the inhabitants of southern Finland. This theory is supported by archeological evidence from Estonia, indicating the Estonian Corded Ware culture had an indigenous background (Lang 1998). If this was indeed the case, the Baltic-Finnic language phylum and people emerged in Latvia and Estonia around 3200 cal. BC, when local hunter-gatherers came under considerable linguistic and cultural influence of farming populations living further south. The appearance of the Corded Ware culture in Finland would then indicate the arrival of the Baltic-Finns in Finland around 3200 cal. BC.

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A recent estimation of the date of genetic divergence of the Estonians and Finns from the mitochondrial DNA data might support this theory. Sajantila et al. (1996) estimated a date of about 3900 (1900 BC) years for the arrival of the Finns in Finland assuming the mutation rate of one substitution in 50 generations and a generation time of 20 years. If the average generation time is 25 years (which is more probable), this date was 4875 cal. BP (2875 cal. BC), which agrees well with the arrival of the Battle Axe (Corded Ware) culture in Finland. However, if the Estonian-Finnish divergence date is based on average mutation rates across the entire nucleotide sequence and the mutation rate is one substitution in 5,000 years (independent of the number of generations), this divergence occurred 10,000 cal. BP (8000 cal. BC) when Finland was first settled. I will return to these dates ahead.

Whether the genetic ancestors of the Finns arrived in Finland 5,000 or 10,000 years ago, the divergence of the Baltic-Finns into different ethnic groups either started or accelerated during the Bronze Age (1500-500 BC). The Scandinavian Bronze culture arrived in the southern and western coastal regions of Finland with Scandinavian immigrants, who had a lasting effect on Finnish gene pools and language. The Finns became genetically similar to the Scandinavians and received Proto-Germanic loan words. These early Scandinavian immigrants were linguistically and genetically assimilated into the indigenous population.

The Middle Ages brought more Scandinavian immigrants into Finland. The Swedish-speaking minority of southern and western coastal regions is descended from the Swedish immigrants who arrived during the years AD 1100-1300. This immigration reduced the Finns' genetic distance from the Swedes (possibly at the expense to that to the Estonians) because there was from the beginning a considerable amount of intermarriage (Virtaranta-Knowles et al. 1991).

The linguistic relationship of the Baltic-Finnish and Saami languages has led to an assumption that the Baltic-Finns and the Saami descend genetically from the same population, and the Baltic-Finns' ancestors diverged from the Saamis' ancestors as a result of fairly recent Baltic and Germanic influences on the first mentioned (see Häkkinen 1996 for a review). However, the Baltic-Finns and Saami are genetically too distant from each

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other to have descended from the common ancestral population that lived only about 5,000 years ago. Therefore, it is more likely that ancestors of the Finns and Saami separated from each other at the beginning of the Last Glacial Maximum about 23,000 BP and met each other again in northern Fennoscandia around 8500 BP.

If the above argument is correct, the so-called Lapps who lived in southern and central Finland still during the early historical period and the modern Saami of northern Fennoscandia were genetically distinct from each other. Archeological evidence may support this theory. Matti Huurre (1983) has argued that the southern boundary of the real Saami was located near the north-south midline of Finland. The genetic distinctness of the modern Saami of northern Fennoscandia (for instance, the "Saami-specific motif" in their mtDNA discovered by Sajantila et al. 1995) may have been inherited from the earliest inhabitants of the Arctic coast, who had arrived in the north along the Norwegian coast. These populations, whose ancestral language is unknown, could have become Uralic (more specifically Lappic)-speakers as a result of cultural contacts with Proto-Lappic speaking people arriving from the south. If this was the case, the Lapps of the southern half of Finland would have spoken Lappic (Saami) dialects, but were genetically similar to populations living further south in the East Baltic region. These southern Lapps were also incorporated into the gene pool of northward expanding Finnish populations during the Middle Ages. The reason why their genetic contribution to the gene pool of the Finns is not detectable may be their genetic similarity with the assimilators.

The genetic affinities of the so-called Lapps of the southern half of Finland are key to solving the Finns' origin. Before we know the genetic structure of the so-called Lapps of the southern half of Finland (through extraction of DNA from old bones) we will never be able to determine the origins of the Baltic-Finns and when the Finns arrived in Finland. If the southern Lapps were genetically Saami, the Finns' ancestors probably did not arrive in Finland until about 3200 BC. If these southern Lapps were genetically non-Saami, the Finns' ancestors could have arrived in Finland when the region received its first inhabitants about 10,000 years ago. In light of the available evidence, we can be certain, however, that the Finn's ancestors

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arrived in Finland at least 3,000 years earlier than the traditional migration theory would allow.

Conclusion

Whenever the Finns' ancestors arrived in Finland, we cannot deny the European origin of the Baltic-Finns and other Finno-Ugric people based on available physical anthropological and archeological data. The genetic and possibly linguistic ancestors of most of the Finno-Ugrian people were very likely the hunter-gatherers who inhabited the periglacial zone located between the Carpathian Mountains and the Volga River during the last glacial maximum. We could say that from a purely physical anthropological point-of-view, the Baltic-Finns are either the easternmost Northwest Europeans or the westernmost Northeast Europeans.

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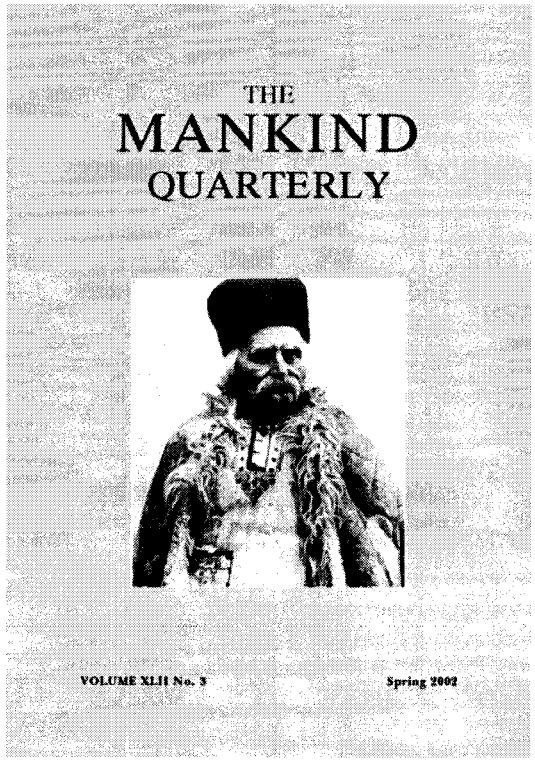

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Finland's Settling Model Revisited

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The author examines the competing hypotheses that have been advanced to explain the origin and migration routes of the Finns, including the suggestion that they formerly inhabited parts of the North European plain immediately to the south of Scandinavia during the latter part of the Würm glaciation. As the ice retreated northwards at the end of the Fourth or Würm glaciation, the ancestors of the Finns similarly moved into Finland from a more easterly part of the North European plain, along the eastern rim of the expanding lake which later became the Baltic Sea.

Key Words: Finns, Saami, Finno-Ugric languages, Indo-European languages, Upper Paleolithic, Mesolithic, Scandinavia, Baltic Sea, North European archeology, Würm glaciation.

In 1980, I included a model for the spread of Mesolithic hunters into deglaciating northern Europe at the end of the Ice Age as a chapter of my PhD thesis. A slightly modified version was later published in an article, *A model for the early settlement of Finland* (1987). The latter was intended as a provocation to prompt discussion, and that it did (Dolukhanov 1989; Leskinen 1989; Welinder 1989; Nuñez 1989); though perhaps not enough. Subsequently, I have updated the subject in lectures and papers on various occasions (e.g. Nuñez 1990, 1995; Nuñez and Taavitsainen 1992). The present article is, as the heading suggests, a reassessment of this 17 year-old model in the light of old and new information.

On the Dates Used

There is no longer an excuse not to use calibrated radiocarbon dates in Finnish archeology now that the tree-ring calibration curve extends far back enough to encompass the whole of Finnish prehistory. This work uses tree-ring calibration for conventional radiocarbon dates back to 10,000 bp (ca. 9200 cal BC) and the calibration based inferred atmospheric spline of coral data for conventional dates within 10,000-18,800 bp (ca. 9200-22,000 cal BC). Since this may be confusing to researchers used to other dating systems, the calibrated values for dates

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between 7500 and 22,000 cal BC will be followed by the corresponding conventional dates labeled bp. To avoid an overlap between calibrated dates and those that fall outside the calibration range, conventional dates beyond 18,800 bp will be "adjusted" by adding 3,000 years and labelled BC. Thus 22,000 bp will become 23,000 BC. The 3,000 years roughly corresponds to the difference between the last calibratable conventional date and its calibrated value: 18,899 bp and 21,950 cal BC. All calibrated dates used here have been obtained with Stuiver's and Raimer's (1993) program. As was the case in the original model (Nuñez 1987), the central calibrated values have been rounded off to the nearest 100 years.

The Original Model

The original model is rather general, both because when it was created – and even now – our knowledge of the vast territories involved was very patchy and because simple general models are best suited to explain long-term processes over large areas. Like T.H. White's hawk, I tried to look at late glacial Europe from such a height that details became blurred and the general underlying processes discernible. The model was based mainly on the extant paleoenvironmental and archeological data and assumed the following:

1. During the glacial maximum, ca. 23,000 BC – 19,500 cal BC (ca. 22,000-18,000 bp) human groups had successfully adapted to life in the inhabitable zone in the periphery of the ice sheet – the so-called marginal zone.
2. It took at least four millennia for the ice border to retreat from its maximum position across northern Europe to southern Finland.
3. The territories uncovered by the gradually receding ice sheet logically would have become occupied by those human groups living in adjacent areas of the marginal zone.
4. These groups spread metachronically (time-transgressively) with the gradually retreating ice border, reaching southern Finland by 8000 cal BC (ca. 9000 bp).
5. Since Finland and neighboring territories to the east and south had been occupied by marginal zone groups that spread through successive splits, there would have been long-term direct/indirect contacts within these territories

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due to the sharing of a cultural heritage (traditions, beliefs, language) and kinship ties.

Sites, Arrows, Population Movements, and Cultures

Some comments and criticism of the old model have been made by archeologists in the past few years. Much criticism stems from misreading and/or forgetting that one is dealing with a model developed 17 years ago on the basis of 20-30 year-old data: Kvasov's (1978) paleomaps with Sulimirski's (1970) sites. Once again I stress that the arrows do not represent actual migration routes (Nuñez 1987:13), they are there to indicate the general direction of movement of the populations of the marginal zone: from the maximum extension of the ice border to its shrunken position some 4,000 years later. As I have repeatedly stated, the spread of humans into deglaciated zones involved no real migrations (e.g. Nuñez 1987:5-7, 1995:4, 1996:4; Nuñez and Taavitsainen 1992:12). How could it? People simply moved into the territories gradually made available by the receding ice sheet, which retreated at a rate of a few kilometers per generation.

Strangely, more attention has been placed on one single illustration, that of marginal zone groups moving into the territories gradually exposed by the retreating ice sheet 15,000-11,000 years ago (1987:5, Fig. 2), than on the text itself. Schulz (1996:26) has brought up the fact that according to recent radiocarbon determinations (e.g. Svezentsev and Popov 1993) the northernmost Russian sites in my diagram (1987:5, Fig. 2) are interstadial and also that the region was subsequently depopulated during the last glacial maximum ca. 23,000 BC – 19,500 cal BC (22,000-18,000 bp). He is quite correct, and by stating this it is clear that he has misunderstood the meaning of my schematic illustration and what the model stands for. As Schulz (1996:26) points out, the Upper Paleolithic hunters of the Russian Plain had fairly stable settlement patterns. This was possible because their territories held a multienvironmental mosaic with a very high biomass. Obviously the location and extension of this privileged territory fluctuated with Ice Age climates through millennia. However, my model and the illustration (1987:5, Fig. 2) are only concerned with the final retreat phases, which took place around 19,500/17,000-11,000 BC (18,000/16,000-11,000 bp). It is, therefore, irrelevant whether some of the sites illustrated in Fig. 2 are from an older

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stage or not. The point made by the illustration is that there were humans living in the marginal zone during the glacial maximum. Above all, it is likely that those late Paleolithic groups then living closest to the ice border would have spread metachronously into the adjacent territories gradually being liberated by the ice sheet.

Already in 1980, it was obvious from the fauna that at least some of the Petchora sites may have been interstadial: *Caves along the Petchora have yielded paleolithic remains with abundant cold fauna and some saiga antelope* (Nuñez 1987:5). Yet a foothold in northwestern Russia at the end of the Pleistocene would have explained the early manifestations of the fuzzy Arctic Paleolithic then postulated by Soviet authors as being distinct from the "eastern Kunda" group and, moreover, it left open the possibility of an eastern component for the early Norwegian Komsa: *This agrees with a westwardly metachronous expansion of Final Paleolithic peoples from the Petchora district, protected from southern influences by the Viena (North Dvina) proglacial lake* (Nuñez 1987:7-8). This statement referred to some relatively unknown North Russian sites Soviet archaeologists labeled as Arctic Paleolithic. If there is indeed a western component in the early Komsa, it would have to be from such an hypothetical group. Recent research does not support the existence of a very early occupation of the Kola Peninsula (e.g. Shumkin 1990; Hesjedal et al. 1996), and it seems that the Arctic Paleolithic was one of those diffuse cultures created without solid chronological anchoring (radiocarbon and/or chronostratigraphy). Although a western ancestry of the early Komsa sites seems to be clear, the possibility of an eastern component must remain open until we learn more about the cultural and deglaciation sequences of the Kola Peninsula (cf. Moller 1996). In any event, the arrows in my illustration (1987:5, Fig. 2) would have been much the same with or without the northernmost Russian sites.

Another source for Schulz's discomfort with my illustration (1987:5, Fig. 2) and the old model seems to be the Desna culture of the upper reaches of the Duina, Dnieper, Desna, and Oka rivers. (*At that time [ca. 12,000 bp] an epipaleolithic Desna-culture, the origin of which is unknown, was born in the region between Central Russia and the Baltic region. Its material has no common traits with the Kunda-culture material. Based on these facts, population movements proposed by Nuñez cannot be defended.*) (Schulz 1996:26)

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There are misconceptions in this statement. First, there is the recurring tendency to see the illustration arrows as specific population routes, despite my clearly stating that they are not. I never expected the actual movements of ice and people to be straight and symmetrical.

The proposed model of population dispersion is a rather schematic generalization of the complex processes by which man may have spread into deglaciated areas. The ice border did not retreat evenly. Periglacial features and proglacial basins presented an uneven and everchanging landscape which continuously affected the distribution of exploitable resources. Locally the direction of movement would have varied according to these factors and, consequently, the arrows of Figure 2 represent only a general trend (Nuñez 1987:13).

Then there is the Desna culture itself, the lithics of which are said to be distinct from earlier local traditions or from those of neighboring areas to the north. I do remember reading Kozlowski's (1979) description of the Desna culture in 1980, but choosing to ignore it as immaterial to the model. I felt that, like the already mentioned Arctic Paleolithic, this may have been another of those cultures without chronological anchoring, i.e. defined and dated on typological grounds alone. Upon reading Schulz's statement (1996:26), I assumed that the antiquity of the Desna culture had been legitimized by new radiocarbon dates, but I was surprised to discover from his diagram (1996:29, Fig. 11) that it has no radiocarbon dates earlier than 7500 cal BC (ca. 8500 bp). As far as one can tell, the Desna could be as old or younger than the Western Kunda (ca. 8600 cal BC; ca. 9600 bp), which may even have earlier manifestations as Schulz (1996:27) himself admits. In other words, the Desna event, whatever it involved, is one that seems to take place when the ice border was much further north and there were people in the East Baltic lands and coastal Scandinavia. Schulz is referring to events outside the model's metachronous time-space realm and, consequently, immaterial to its functioning.

But even if we regard the Desna event as a possible factor – as I did in 1980 before choosing to ignore it – there is little effect on the model. If Desna lithics have no local roots, all or part of the area's Final Paleolithic population may have shifted north with their traditional resources and environments:

> Probably some groups never split, remaining or leaving their original home areas as a single band. In either case, empty

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territories would have been eventually occupied by neighbouring groups (Nuñez 1987:13).

If the first alternative is true, then those staying behind may have adapted to the new environments by developing completely new toolkits which could seem intrusive to our imperfect knowledge. Obviously new toolkits may also reflect a pre-emptying of the area prior to the arrival of new people in uninhabitable territory.

Summing up, despite certain criticism based on misconceptions, the data accumulated during the last 17 years do not seem to contradict or significantly affect the old model. On the contrary, they support some of its assumptions and/or clarify previously ambiguous points. What follows is an updated version of the old model based on the new evidence.

Würm III

Modern humans appear to have spread into Europe during the favorable interstadial conditions of Würm II/III 40,000-30,000 years ago. Organogenic deposits datable to this period indicate that Fennoscandia was free of ice at this time (e.g. Donner 1988; Donner et al. 1986; Nuñez 1991b), but there is no unquestionable evidence of human activity in Finland from that time so far.

The cooling of world climates some 30,000 years ago led to the new glacial advance of the Würm III stadial. The Scandinavian ice sheet spread once again, reaching its maximum extent about 23,000 BC (ca. 22,000 bp). It is difficult to visualize Europe at this time (Fig. 1). The huge water masses trapped in the ice sheet had caused ocean levels to drop by over 100 meters, exposing the continental shelf and joining the British Isles with the mainland. However, despite this land increase, the amount of inhabitable land decreased by about half due to vast ice sheets, alpine glaciers, and the prolonged water systems fed by them. One consequence of this situation was the division of Ice Age Europe by glaciers and their water systems into regions that functioned as some sort of cultural provinces. Although the barriers between them were not unpassable, they did restrict the flow of genes and culture between two neighboring provinces impeding contacts between those without a common boundary.

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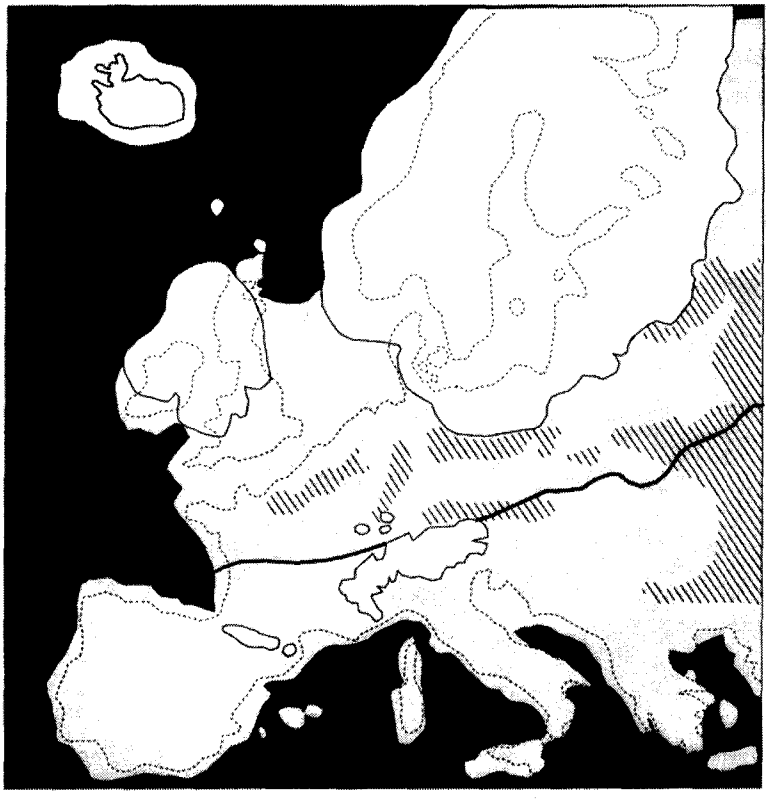

Fig. 1. Europe during the glacial maximum. Observe that the barrier formed by the arctic front and desert between the Scandinavia and Alpine ice sheets practically divided the marginal zone into east and west provinces. Another noteworthy feature is the large area of the North Sea bottom that was ice- and water-free during or at least shortly after the glacial maximum.

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Among the various cultural provinces of glacial Europe, the most interesting ones are those from which we can expect population movements into Fennoscandia at the end of the Ice Age, namely the North European Plain in the west and the Russian Plain in the east (Fig. 1). During the glacial maximum some 23,000 BC–19,500 cal BC (ca. 22,000-18,000 bp), possibly some time before and after as well, these two regions were practically isolated from each other by the constant cold front and periglacial desert that lay between the Scandinavia and ice sheets. In other words, while human groups from these two regions had been free to move and exchange culture and genes ca. 40,000-30,000 years ago, interaction became increasingly difficult after 30,000 years ago and must have ceased by 23,000 BC (ca. 22,000 bp). This situation lasted for at least 4,000 years, until world climates turned warmer and glaciers began to recede.

Northern Europe ca. 19,500-9300 cal BC (ca. 18,000-10,000 bp)

By 19,500-17,000 cal BC (ca. 18,000-16,000 bp) considerably improved climates were causing the ice sheet to melt and expose new land for colonization by plants and animals. Although the ice retreated very slowly in terms of human life spans – no more than a few kilometers per generation – it led eventually to considerable changes in human life-ways as game-rich grasslands gave way to forests with less gregarious faunas.

It took at least 4,000 years for the retreating ice border to reach southern Finland, where it lingered 1,500-2,000 years. It was around this time that human groups from neighboring areas began to expand into the ice-free areas of Fennoscandia, their routes very much dependant on the water/ice barriers that lay in their paths. Around 10,100-8500 cal BC (ca. 10,300-9500 bp) the groups of the marginal zone can be placed within two major cultural complexes (Fig. 2):

1. A **western complex** consisting of groups derived from Late Paleolithic reindeer hunters that reached quite early the Scandinavia west coast via the dry North Sea bottom and/or via southern Scandinavia and then followed the existing ice-free corridor along the Norwegian coast exploiting its rich marine resources. They moved north, reaching Norway's northernmost coast by 9000 cal BC (ca. 9800 bp).
2. An **eastern complex** that occupied a vast area south and

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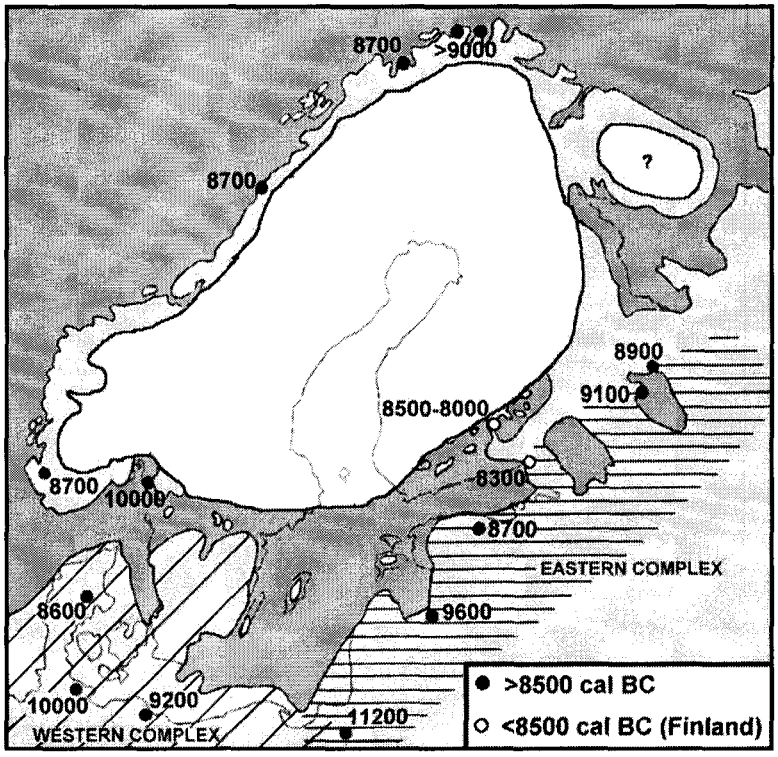

Fig. 2. The Yoldia Sea stage of the Baltic (ca. 10,100-8500 cal BC, 10,200-9500 bp) with the western and eastern complexes of the marginal zone and their early radiocarbon dates (cal BC).

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east of the ice border, from eastern Poland to Northwest Russia. They exploited both forest and fresh water resources. For obvious reasons, it is most likely people from this complex that spread into southern Finland by 8000 cal BC (ca. 9000 bp). Early dates from the eastern complex seem to fall within 10,000-8500 cal BC (ca. 10,000-7500 bp).

Finland 8500-7500 cal BC (ca. 9500-8500 bp)

The stadial conditions of the Younger Dryas gave way to fairly warm climates that caused the rapid melting of the ice sheet and left the land free for the spread of flora, fauna, and humans. By 9000 cal BC (ca. 9800 bp) the ice sheet had begun its final retreat and the highlands of southeastern Finland were ice/water free. The retreating and weakened periglacial front was closely followed by a pioneer vegetation belt of shrubs and grasses. Advancing behind, at least in the south and southeast was a birch/pine-dominated forest zone, the home of a Mesolithic population that exploited forest game and aquatic environments. By 8000 cal BC (ca. 9000 bp) Finland was virtually ice-free.

When humans arrived in Finland around 8500-8000 cal BC (ca. 9500-9000 bp), they found a dynamically changing world very different from the Finland we know today. Much of the country was still covered by ice or water. The ice sheet was melting fast due to the improved climates and Fennoscandia, previously depressed by the 2-3 kilometer thick ice sheet, was now rapidly rising isostatically as it became free of the ice weight. The Baltic Basin was a huge lake (Ancylus Lake) fed by melt from the wasting ice, and much of Finland's territory free of ice and water formed an archipelago in the Ancylus Lake. By 8000 BC (ca. 9000 bp) the considerably shrunken ice sheet could no longer maintain high levels and the Ancylus Lake dropped dramatically within a few centuries. The combined effects of receding water levels and rapid land uplift led to regressive shoreline displacement rates of ca. 12 meters / century in the northwest and ca. 3 meters / century in the southeast. During this rapid regression episode the country's major inland lake systems were isolated from the Baltic basin and much land emerged, making room for the further spread of humans into the country.

The only Finnish find unquestionably datable to the first

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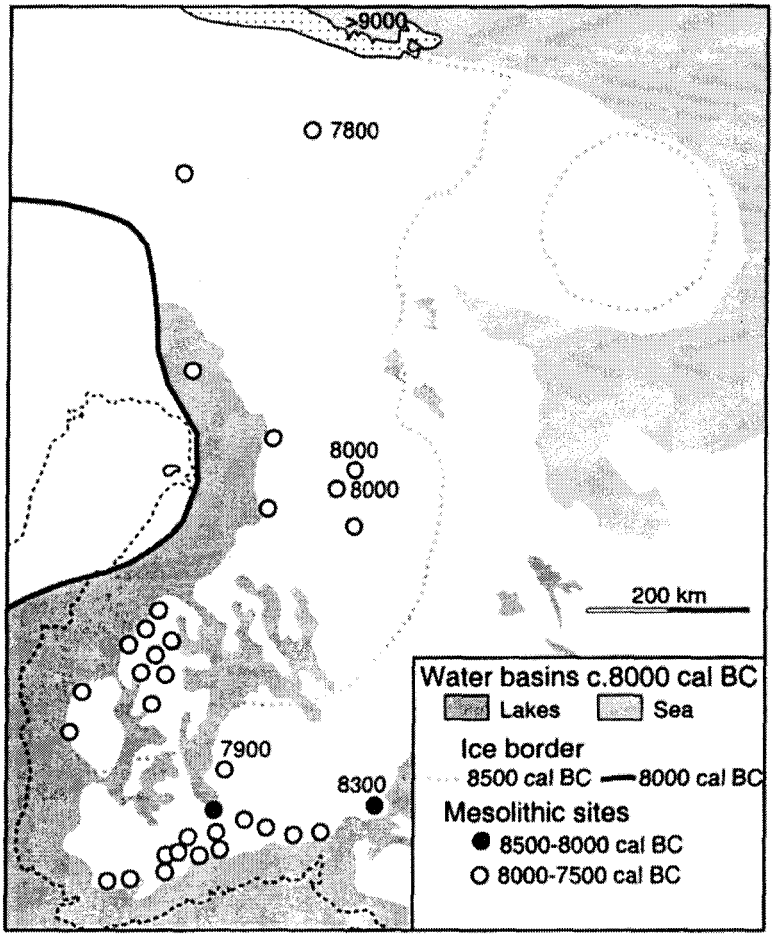

Fig. 3. The Ancylus Lake stage of the Baltic at ca. 8000 cal BC (ca. 9000 bp) with the position of the ice sheet border at around 8500 and 8000 cal BC (resp. 9500, 9000 bp) and the early Finnish sites (mainly after Schulz 1996). Radiocarbon-dated sites have been marked with their calibrated values (cal BC).

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half of the Ancylus Lake stage (ca. 8500-8000 cal BC; ca. 9500-9000 bp) is the Antrea fishnet, with two radiocarbon ages around 8300 BC (ca. 9300 bp). The Heinola sledge dates to ca. 7,900 cal BC (ca. 8,900 bp), and the Kirkkonummi bone ice-pick could date from the same period but may also be somewhat younger. There are also some sites with radiocarbon dates from this period (Hyrynsalmi and Suomussalmi ca. 8000 cal BC cal BC (ca. 9000 bp), Inari ca. 7800 cal BC (ca. 8800 bp) and several others that should date to the regressive phase of the Ancylus Lake (ca. 8000-7500 cal BC; 9000-8500 bp) on the basis of their altitude above present sea level. Schulz (1996) lists dozens of such sites (Fig. 3), which is a dramatic increase from those known in the 70s and 80s (Siiriäinen 1974; Nuñez 1978, 1987).

A population flow from neighboring territories is suggested by the earliest finds, which reflects eastern-complex ancestry and the local Mesolithic culture. The bone artifacts from Antrea and Kirkkonummi have parallels in both the East Baltic and Northwest Russia. Moreover, remains similar to the Antrea net have been recovered from Baltic Kunda sites, and close duplicates of the Heinola sledge have been reported from the Wis area in Northwest Russia. The axe from the 10,200 year-old Antrea site is made of a specific rock from the Lake Onega region, while the use of quartz microliths in slotted knives from the same site indicates adaptation to flintless Finland. Of particular interest is the site of Ristola, in Lahti, which could be contemporaneous with the Antrea site in terms of altitude and finds. Unlike the other quartz-bearing early Finnish Mesolithic sites, Ristola is rich in flints that are both petrographically and typologically similar to those of East Baltic Kunda sites.

There are several facts that speak for the development of a Finnish Mesolithic culture adapted to the local materials and environments of newly occupied territories already by the 8th millenium cal BC (approximately the 9th millenium bp). Early Finnish Mesolithic toolkits consisted mainly of quartz scrapers and knives, characteristic wood-working tools (axes, adzes, gouges), leaf-shaped slate points and perforated spherical stone objects.

What can be said about the life ways of the first inhabitants? Some sort of water transport is suggested by the Antrea finds, which were deposited at the bottom of an Ancylus bay when the vessel carrying them was overturned. Furthermore, the net was

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of a type that would have required some sort of watercraft for its operation. Winter transportation is indicated by the Heinola sledge runner. The use of boats and nets points to fishing and the Kirkkonummi ice pick points to the need of breaking ice for winter fishing. The artifacts of elk and swan bone from Antrea suggest the exploitation of both land mammals and water fowl and the refuse faunas from early dwelling sites point to the exploitation of both land and water resources. Gathering may have played a role. Even if many plant species were still in the process of spreading into the country, there were plenty of plant-foods to collect. Water-chestnut remains have been reported from Ancylus layers, and some of the most nutritious plant-foods collected by the Canadian natives were roots of such common aquatic plants as club-rush, reeds, water-lily, and watercress (Auer 1925; Johnston 1970; Donner 1976; Nuñez 1991a). It is, therefore, possible that the "clubs" so characteristic of this period were not weapons as usually thought, but weights for digging-sticks used in the procurement of roots. Very similar digging-stick weights have been ethnographically reported from traditional societies all over the world. Other digging uses are possible, and it is conceivable that such weights could have been employed to increase the mass of bone ice picks (Broadbent 1978). Experiments recently carried out at Oulu showed that the time needed to open a hole in the ice was reduced by about half when such stone weights were attached to the bone ice pick handle (Joona 1996).

The settling scheme by Schulz (1996) based on the new early site data is very similar and supports the results derived by myself (Fig. 4) and others (Matiskainen 1996) grounded on somewhat scantier data.

The archaeological material suggests that the above-mentioned group [eastern complex] reached southern Finland by 8200 cal BC and the Suomusalmi area by 8000 cal BC. These hunter-fishers, who knew both boat and slege, had spread over southern and central Finland, possibly further north, by 7500 cal BC (Nuñez 1975:13).

This was the first and probably the last major population movement to affect the whole of Finland within a relatively short time period: arrival by 8200 cal BC, spreading over the southern half of the country by 8000 cal BC and reaching northernmost Finland by 7500 cal BC.

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Archeology, Bioanthropology, and Linguistics

The simplest and therefore most likely scenario on the basis of archeological data is that at least some of the Mesolithic groups that moved into Finland at the end of the Ice Age about 10,000 years ago were the ancestors of the Finns and Saami and spoke languages/dialects ancestral to those spoken by them in historical times. There are no archeological indications of any major migration event(s) that would have later brought a language change. The closest to that would be the Corded-Ware/Boat-axe episode in Southwest Finland around 3200-2500 cal BC (ca. 4500-4000 bp). The archeological record could be interpreted as the arrival of group of a few hundreds bearers of this farming culture from the East Baltic, presumably Estonia, within a short time. Since the newcomers' economy was not suitable for Finnish environments, they ended up adopting the hunting-fishing life-ways of the local Comb ceramic people. Eventually they were assimilated by the latter, who would have been themselves influenced by the immigrants' culture (farming ways, traditions, loanwords, genes). The next archeological culture in the area, the farming Kiukais culture of ca. 2500-1500 cal BC (ca. 4000-1200 bp), is a hybrid with both Corded-ware and Comb ceramic traits.

Historical-linguistic interpretations of the origins and early history of Finno-Ugrian / Uralic languages have changed considerably during the 1980s and 1990s. The traditional notion of an ancestral homeland and a nearly biblical migration of Finnic speakers to the East Baltic and Finland 2,000 years ago seems to have lost ground to new ideas that give a greater time depth and geographical span to Finnic languages (e.g. Sammallahti 1995; Wiik 1995, 1996; Julku 1996). Indeed, Finnougrian linguistics seem to be undergoing profound changes. Traditional paradigms are being replaced by ideas that would have been rejected by most Finnougrists 20 years ago. Currently those Finnish linguists who are willing to concede an early existence of some ancestral form(s) of Finno-Ugrian / Uralic languages by 10,000 years ago seem to be entrenched within two groups: those who would see such ancestral language(s) spoken over a wide territory towards the end of the Ice Age; and those who, based on the uniformity of certain elements, would place the ancestral form(s) spoken within a limited area. There seems to be much argumentation about this,

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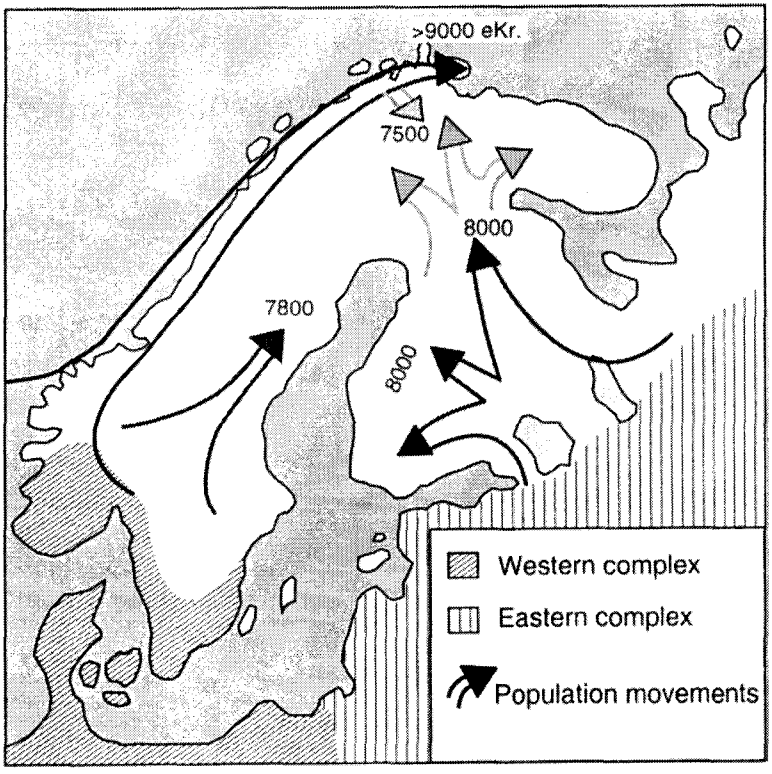

Fig. 4. The initial settlment of Fennoscandia at the end of the Ice Age with approximate cal BC dates.

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even when the two alternatives need not be exclusive of each other. As can be seen from the updated model presented here, there would have been plenty of time for the spread of early speakers along the marginal zone before their actual northbound expansion into the slowly deglaciating territories of northern Europe.

The latest bioanthropological results from osteology and molecular biology place both modern Finns and Saami within the European stock but find the Saami quite distinct from the Finns, who are much closer to the rest of the Europeans (Cavalli-Sforza and Piazza 1993; Niskanen 1994a, b; Sajantila and Pääbo 1995; Sajantila et al. 1995). Certain mtDNA sequences found in the Saami are so rare among the Finns and other European populations that some of their ancestors must have lived in isolation for a long time. Both osteology and molecular biology results are clear about the relationships, but there are still wrinkles to iron out. The DNA clock may not be quite syncronized yet, and the data come from modern populations that have been grouped by country, language, and/or life-ways. Although this may reflect the situation today, it does not necessarily tell the whole 10,000-15,000 year long story.

Furthermore, the morphogenetic north-south dichotomy in Fennoscandia is not restricted to humans. It is detectable also among several other species (insects, spiders, lizards, cervids, and bears), which were in Finland long before the arrival of the Corded-ware folk some 5,000 years ago. These dichotomies can be neverthless explained as these taxa reaching Fennoscandia via more than one route.

On the other hand we are tempted to equate the Saami of North Fennoscandia with an early group that had separated from the rest of the Northwest European Plain group during the milder conditions of the Bölling-Alleröd stadials (ca. 13,500-11,000 cal BC; 13,000-11,000 bp), possibly even earlier, and ventured into the North Sea bottom, which was free of ice and water, by 19,500 cal BC (ca. 18,000 bp). There they may have remained in isolation until the arrival of northbound group(s) from Finland's interior in the 8th millenium cal BC (approximately 7th millenium bp), but their geographical situation in northernmost Fennoscandia may have continued to grant them a relatively high degree of isolation.

Then on the other hand, there is the occurrence of relatively

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small teeth in the ca. 150 individuals buried in the mid-7th millenium cal BC (ca. 7500 bp) at the Mesolithic cemetery of Olene Island of Lake Onega and other eastern populations. The teeth from Fennoscandian or other West European populations from the Mesolithic or later periods are clearly larger. The only exception seems to be the historical and modern Saami. This feature has been interpreted to reflect a founder effect, which would link the Saami with the Olene Island and other early eastern European populations (Jacobs 1992).

Despite the major achievements of the past ten years, the picture projected by the archeological, bioanthropological, and linguistic data is still fuzzy, and will probably remain so until we are able to extract and analyze old DNA from archaeological bones.

Concluding Remarks

Based on the available archeological, bioanthropological, geological, and linguistic data the old settling model can be updated as follows:

1. During the glacial maximum the human groups living in the marginal zone of the West European Plain and the Russian Plain were isolated from each other.
2. As climates improved and glaciers eased their grip on Europe, the east-west barrier gradually disappeared, making it possible for genes and culture to flow east-west from Russia to England by 13,500 BC (ca. 13,000 bp).
3. Around the same time the east-west barrier was fading, possibly in Bölling-Alleröd times (ca. 13,500-11,000 cal BC; 13,000-11,000 bp), some group(s) separated from the other ones of the West European Plain by moving via either the dry North Sea bottom or along the West Scandinavian coast, and managed to get a foothold in the West Norwegian coast. From here they continued north when the coastal corridor became ice-free and reached northernmost Norway by 9000 cal BC (ca. 9800 bp).
4. The groups occupying the marginal zone of the Russian Plain, expanded metachronously into the territories freed by the slowly retreating ice. Members of this eastern complex had spread into the southern half of Finland by 8000 cal BC (7000 bp), and this forceful colonization front continued to advance, reaching northernmost Finland by 7500 cal BC (8500 bp).

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5. A parallel advance was made in Sweden by members of the western complex, but they were delayed in their path by the ice sheet that still lingered in northern Norrland.
6. The group(s) that had first separated from the western complex and reached the North Norwegian coast around 9000 cal BC (ca. 9800 bp) remained in isolation until Finland became ice-free and contacts with group(s) spreading northwards was possible. It is not clear if the maritime-oriented early dwellers of the Norwegian coast spread much inland, but they would have anyway ended up interacting with the newcomers from the south.

One major danger with multidisciplinary research is that scholars from one discipline may seek support in another one, giving thus rise to a closed system validated by circular arguments. Unfortunately, a survey of earlier literature shows that our field is not immune to that. Can this be avoided? A good preventive measure may be to independently construct scenarios based on the various data sets and submit them to thorough scrutiny before one or more, if any, can be deemed feasible. The updated version of the model presented above is submitted as one such preliminary basic scenario for scrutiny and discussion.

To conclude it can be said that although progress has been made in all fields during the last two decades, many questions still remain unanswered. The reader is left with some of them:

- What is the antiquity of the languages ancestral to the historical Uralic / Finno-Ugric and Indo-European languages in Europe and where were they spoken?
- Are the early dwellers of the North Norwegian coast direct ancestors of the Saami and did this early population speak a language ancestral to modern Saami dialects?
- Are the distinct morphogenetic traits of the modern Saami due to the long-term isolation of a population group(s) that separated early from other marginal groups via the dry North Sea bottom and/or the Scandinavian coast to reach secluded northernmost Fennoscandia?
- Are the small teeth of the historical Saami a sign of common ancestry or of early interaction with early Mesolithic group(s) from the eastern complex?

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- Did some or all the groups of the eastern complex speak dialects ancestral to the Finno-Ugrian languages spoken in northern Europe in historical times?
- Are the close morphogenetic affinities between modern Finns and Europeans due to a Corded ware migration to Southwest Finland some 5,000 years ago, or were those traits already present among Finland's Mesolithic settlers as the Olene Island and Zveinieki populations suggest?
- Is Sajantila and Pääbo's somewhat paradoxical interpretation a feasible one? Corded-ware immigrants genetically overwhelming Finland's population but adopting their language?
- Were the Corded-ware people, who presumably migrated to Southwest Finland via Estonia, Indo-European speakers as is generally assumed, or did they speak a Finnic language?

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The European Origin of the Finns and their Relation to the Indo-Europeans

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The author traces the history of the prevailing hypothesis which assumes that the ancestors of the present-day Finns and Estonians migrated into their contemporary north European homeland as recently as two thousand years ago. Instead, he suggests that during the latter part of the Würm glaciation, more than ten thousand years ago, when northern Europe was still covered by ice, they and the Saami (Suomi) were hunters and fishers who occupied an area between the Danube and the Ukraine. They subsequently followed the retreating ice northwards into the eastern Baltic, as that area became habitable. His theory, which is regarded as controversial, would see Finno-Ugrian speakers inhabiting northern Europe before Indo-European speaking farmers displaced them in Northern Germany and western Scandinavia.

Key Words: Finns, Estonians, Saami (Suomi), Finno-Ugric languages, Indo-European Languages, Basque language, northern Europe, Baltic Sea, Scandinavia, North European plain, Würm glaciation, Upper Paleolithic, Mesolithic, Neolithic.

I once defended a hypothesis in an international conference that the Finno-Ugric people must have lived a long time ago both further west and south than indicated by their recent territories. I based my hypothesis, above all, on the picture provided by modern archeology, which shows that when the ice gradually melted after the glacial maximum and people were able to live in more northern regions the main direction of the gradual settlement expansion was from south to north and not from east to west. The most prominent counter-argument was the following: The process described is a process in world history, but our purpose is to discuss a possible east-to-west migration of the Finno-Ugric people from their original homeland to their more recent territories during the relatively recent times. My response was naturally that we are discussing the same thing, but that we date and derive the direction of the Finno-Ugric migration entirely differently, and, furthermore, the history of the Finno-Ugrians is part of the world's history, as

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is the history of any other people.[2]

I have often been asked in Finland – as also Kalevi Wiik has been asked – whether my views of the Finno-Ugrian origin reflect Finland's recent membership in the European Union are an attempt to forcefully acquire European roots for the Finns. Of course, the answer has been that the purpose is to make Finns aware of what international research has discovered of their origins.

The relationships of the Indo-European and the Finno-Ugric people, cultures, and languages have been the most varied during the past millennia. Hardly a single hypothesis presented so far is capable of explaining the entire history of the Indo-Europeans, nor the millennia of developmental stages taking place in the large territory inhabited by the Finno-Ugrians.

The problem of the origin of the Indo-Europeans has been discussed for some 400 years, since the Bonaventura paper, which demonstrated that the German and Persian languages include 22 common words (cognates), was published in 1597.[3] Since then possibly three to four hundred different hypotheses of the original Indo-European homeland have been proposed, but none of them has gained a dominant and widely-accepted position.

The discussion about the Finno-Ugric people's original homeland and migrations has continued for over a century, but to the present only one hypothesis – that the Finno-Ugrians originate from the Volga Bend or the Urals – has been proposed. When heretical ideas have been presented, the ruling consensus has ignored them. The research has focused on answering four prominent research questions: 1. Where was the original Finno-Ugrian homeland? 2. How did the linguistic relationships of the Finno-Ugrians develop? 3. How did the Finno-Ugrians spread from their area of origin? 4. What linguistic loans have the Finno-Ugrians received from the Indo-European and possibly other languages?

Informed research has only recently expanded outside these constricting boundaries. This expansion has occurred primarily

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[2]Szombathely 9.-10.10.1996.

[3]After Kilian. See Lothar Kilian, Zum Ursprung der Indogermanen. Forchungen aus Linguistik, Prähistorie und Anthropologie (Habelt Sachbuch. Forschung in verständlicher Darstellung Bd. 3.2. erweiterte Auflage. Bonn 1988), p. 11.

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in four directions: 1. The archeological past since the Last Glacial Maximum of the Finno-Ugric people is finally being studied.[4] 2. It has been once again realized after a hundred years that because the Indo-Europeans and other languages have left marks in the Finno-Ugric languages that the influence could also have been the other way around.[5] Although a few attempts in this direction have already been made during the last one-hundred years, these attempts have not been given broad attention, they have been either ultra-nationalistic, or they have been rejected for political reasons.[6] A recent and brilliant realization that we can consider the two-directionality of the linguistic influences as a general phenomena is to the credit of Kalevi Wiik, a professor in Turku.[7] The application of evidence provided by genetic studies are new in the field.[8] 4. Modern physical anthropology has provided more new views.[9] Combining the results of these four fields of research has given birth to an entirely different view of the earliest history of the Finno-Ugrians from that provided by the traditional approach.

The most fundamental question in the new Finno-Ugric problem is the question of whether the Baltic-Finns (mainly the Estonians and Finns, although the problem deals also with all the other Baltic-Finns) had migrated to their recent territories

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[4]See for example Tadeusz Sulimirski, Prehistoric Russia.: An Outline. (Dublin 1970); Paul M. Dolukhanov, Ecology and Economy in Neolithic Eastern Europe (New Approaches in Archaeology. Ed. Colin Renfrew. New York 1978); Milton Nuñez, A Model for the early settlement of Finland (Fennoscandia Archaeologica IV. Helsinki 1987); P.M. Dolukhanov, Prehistoric ethnicity in the north-east Europe – comments on the paper by Milton G. Nuñez, (Fennoscandia Archaeologica VI. Helsinki 1989).

[5]Already in 1899, the German, Franz Nikolaus Finck, presented ideas of the possible Finno-Ugric substratum in the Germanic languages. See Franz Nikolaus Finck, Der deutsche Sprachbau als Ausdruck deutcher Weltanschauung. Acht Vorträge (Marburg 1899), p. 40, 62.

[6]See for example Julius Pokorny, Substrattheorie und die Urheimat der Indogermanen (Mitteilungen der Anthropologischen Gesellschaft in Wien LXVI/1936); see also for example W.B. Lockwood, Indoeuropean Philology. Historical and Comparative (London 1969).

[7]See reference 48.

[8]L. Luca Cavalli-Sforza – Paolo Menozzi – Alberto Piazza, The History and Geography of Human Genes (Princeton, New Jersey 1994); Antti Sajantila et al., Genes and Languages in Europe: An Analysis of Mitochondrial Lineages (Genome Research 5/1995).

[9]Markku Niskanen, Itämerensuomalaisten alkuperä fyysisen antropologian näkökulmasta / *The origin of the Baltic-Finns in light of physical anthropology* (This volume).

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only relatively recently, as the traditional view maintains. Vilhelm Thomsen, one of the most important founders of traditional Finno-Ugristics, dated the arrival of the Finns in Finland as recently as AD 800-900.[10] Alfred Hackman's view, according to which this immigration occurred during AD 100-800, however, became the most commonly accepted view. Hackman based his theory mainly on the lack of finds from the Older Roman Iron Age in Finland.[11]

Hackman's hypothesis was established as the consensus,[12] although a few archeologists expressed reservations about it. Julius Ailio and Aarne Äyräpää were the most prominent of these in Finland. Ailio presented in 1917 his view that the Häme Finns descend directly from the local Comb Ware people in his history of the city of Hämeenlinna.[13] Somewhat later, he located the Finno-Ugrians' area of origin in the Valdai regions, which coincides well with the recent view.[14] Aarne Äyräpääs writings pointed entirely in the same directions.[15] Both researchers were forgotten later. Ella Kivikoski did not mention Ailio's articles at all in the bibliography of her comprehensive work, and Äyräpää was mentioned only in entirely different contexts.[16] The same is also true with those constructing more recent hypotheses.[17]

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[10]Vilh. Thomsen, Den gotiske sprogklasses indflydelse på den finske. En sprìghistorisk undersìgelse (Kìbenhavn 1869); Über den einfluss der germanischen sprachen auf die finnisch-lappischen (Halle 1870); Beröringer mellem de finske og de baltiske (litausk-lettiske) Sprog. En sproghistorisk Undersìgelse (Det Kgl. Danske Videnskabernes Selskabs Skrifter 6/1890).

[11]Alfred Hackman, Die ältere Eisenzeit in Finnland I (Helsingfors 1905).

[12]See for example E.M. Setälä, Suomensukuisten kansojen esihistoria (Suomen Suku I. Helsinki 1926); Die Urgeschichte der Finnen. Ein Überblick (Deutschland und der Norden. Breslau 1931); K.B. Wiklund, Zur Kenntniss der ältesten germanischen Lehnwörter im Finnischen und Lappischen (Le Monde Oriental 5/1911). There is a legion of literature dealing with this topic, and there is no reason to provide a detailed bibliografia all of it.

[13]Julius Ailio, Hämeen linnan esi- ja rakennushistoria (Hämeenlinnan kaupungin historia I osa. Hämeenlinna 1917). See also Oscar Almgren, Några svensk-finska stenåldersproblem. Ett orienteringsförsök (Antikvarisk Tidskrift för Sverige 20/1914).

[14]Julius, Ailio, Onko suomalais-ugrilainen alkukoti ollut Skandinaaviassa vaiko Venäjällä (Hist. Aik. 21/1923).

[15]Aarne Äyräpää, Suomen varhaisin esihistoria, kivi- ja pronssikausi (Oma Maa IV. Porvoo 1958).

[16]Ella Kivikoski, Suomen esihistoria (Suomen historian I osa. Ed. Jalmari Jaakkola. Porvoo 1961).

[17]Torsten Edgren, Kivikausi (Suomen historia I. Espoo 1984); Den förhistoriska tiden (Finlands historia I. Ekenäs 1992); Matti Huurre, 9000 vuotta Suomen esihistoriaa (Keuruu 1979).

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Linguists were close supporters of the Migration theory, and a consensus emerged that the Baltic-Finns had migrated according to a very precise and recent chronology from an original homeland located in the Volga Bend, Oka and Kama rivers and the Urals toward the west.

The views did not change until the research of Harri Moora, an Estonian archeologist.[18] He based his theories on an opinion that the Typical Comb Ware-using people were direct ancestors of the Finns (the Baltic-Finns). Paul Ariste, a leading Estonian linguist, agreed with Moora's views.[19] Other Estonian archeologists followed Moora's footsteps, but these views were received with reservation in Finland.[20] One aspect of Moora's views is worth mentioning. He presented views that deviated from the traditional Finnish views but which had been presented much earlier in the international research. Moora and the Finnish colleagues were equally unaware of these views. This is understandable in Moora's case because he did his writing during the period of foreign occupation, when it was hard to maintain relations with the West. Finland, however, was not under foreign occupation, but the conclusions of this research remained little known internationally.

This situation changed also in Finland with time. C.F. Meinander's watershed-marking article, Dåvits, in 1969 he demonstrated a settlement continuity across the period from which no finds had been known previously.[21] The theory of the Finns' recent arrival in Finland was mainly based on the fact that no Older Roman Iron Age finds were known. Starting with Meinander, this gap in the archeological record began to get filled with new finds. Eventually, it became clear that there had been a gap only in researchers' information. The situation developed to a point that a multidisciplinary symposium was

[18]Harri Moora, Eesti rahva ja naaberrahvaste kujunemine arheoloogia andmeil (Eesti rahva etnilisest ajaloost. Artiklite kogumik. Ed. Harri Moora. Tallinn 1956); Zur ethnischen Geschichte der ostseefinnischen Stämme (Suomen Muinaismuistoyhdistyksen aikakauskirja 59/1958).

[19]Paul Ariste, Läänemere keelte kujunemine ja vanem arenemisjär (Eesti rahva etnilisest ajaloost. Ed. Harri Moora. Tallinn 1956).

[20]For example, Ville Luho, Die kammkeramische Kultur und die Finno-ugrische Frage (Congressus Secundus Internationalis Fenno-Ugristarum. Pars II. Helsinki 1968).

[21]C. F. Meinander, Dåvits. En essä om förromersk järnålder (Finskt Museum 1969. 76 årgongen. Helsingfors 1969).

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organized in Tvärminne in 1980. Nobody supported the migration theory in this conference. However, a complete consensus about the date when the Finns could have arrived in Finland was not reached.[22] C.F. Meinander represented the view that especially the Typical Comb Ware period should be considered as the period of the Finno-Ugrians' arrival.[23] I will return to this assumption in more detail later.

Three different hypotheses or views have been proposed in Finland more recently: Possibly the most commonly accepted view is that the ancestors of the Finns (the Baltic-Finns) migrated into Finland during the Typical Comb Ware period. A view that the Baltic-Finns descend from the first post-glacial settlers of the region is also rather strong. The third set of researchers ignore the entire question of ethnicity as a prehistoric problem.

Kaisa Häkkinen is among those who have recently supported the idea that the arrival of the Typical Comb Ware marked a large migration of the Finno-Ugrians, especially the Baltic-Finns.[24] Christian Carpelan follows the same line. Their common opinion was presented in the following categorical way in 1995: "Both Kaisa Häkkinen and Christian Carpelan associate the Typical Comb ware and the Finno-Ugric language."[25] Häkkinen continues: "The linguistic ancestors of the modern Finns arrived in their territories most likely during the Typical Comb Ware period."[26] As Kaisa Häkkinen says: "When the Late Comb Ware started about 2800 BC, the Proto-Saami-Finnish, or the early Proto-Finnic had been established as the language of the original inhabitants also. According to Carpelan, a language can be established, for example, because it was used as a trade language."[27]

The above comments indicate that Carpelan does not

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[22]Suomen väestön esihistorialliset juuret. Tvärminnen symposiumi 17.-19.1.1980 (Bidrag till kännedom av Finlands natur och folk. Societas Scientiarum Fennica. H. 131. Helsinki 1984).

[23]C. F. Meinander, Kivikautemme väestöhistoria (Suomen väestön esihistorialliset juuret).

[24]Kaisa Häkkinen, Suomalaisten esihistoria kielitieteen valossa (SKS Tietolipas 147. Hämeenlinna 1996), passim and especially p. 73, 118.

[25]Christian Carpelan and Kaisa Häkkinen. See Kirsi Korpela, Mistä tulit, suomalainen? (Tiede 2000 4/95).

[26]See reference 24, p. 64.

[27]See reference 24, p. 64.

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consider the language of the earliest inhabitants – pre-dating the Typical Comb Ware – to have been Finno-Ugric. He has written in his earlier articles that the earliest inhabitants spoke an unknown language.[28] He represented the same view at Tvärminne also: "Instead one must assume that in this situation the original inhabitants gave up their language, which is unknown to us, and adopted the Finnic language of the newcomers, in which case there can be assumed to be substrate traits as remnants from the older language."[29] The prehistoric population speaking the unknown language appears to be *deus ex machina* for Carpelan everytime he finds himself at a dead end. In one of his most recent comments in 1996, Carpelan appears to be wandering in Russia[30] like Ernst Manker[31], a Swedish Lappologist, whose writing makes it seem as if the Saami travel a circle around Finland.

As far as the substrate is concerned, a claim that some unknown language has left a substrate is not good enough, but one must also demonstrate its existence. The Estonian Paul Ariste[32] attempted to do this, but his hypothesis has been proven wrong.[33] Another argument for a substrate idea is the fact that there has been no success in providing an etymology for the names of certain of the largest river and lake systems of Finland. These include the names Päijänne, Saimaa, Imatra, and Vanaja. The vast majority of the river and lake names have been provided by purely Finnish etymologies. The lakes and rivers mentioned by name are among the more important ones. Therefore, one can assume that their names are also the oldest ones. In this case, it is a strong possibility that when linguistic

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[28]Christian Carpelan, Saamelaisten ja saamelaiskulttuurin alkuperä arkeologian näkökulmasta (Lapin Tutkimusseuran Vuosikirja XVI/1975).

[29]Christian Carpelan, Katsaus saamelaisten esihistoriaan (Suomen väestön esihistorialliset juuret); Carpelan, Östersjöfinnarna; Torsten Edgren, Den förhistoriska tiden (Finlands historia I. Ekenäs 1992); Carpelan, Mikä on alkuperämme (Hiidenkivi 4/1996).

[30]Carpelan, Mikä on alkuperämme.

[31]Ernst Manker, De åtta årstidernas folk (Göteborg – England 1963/74), p. 24-25.

[32]Paul Ariste, Keelekontaktid. Eesti keele kontakte teiste keel tega (Tallinn 1981), p. 13-19.

[33]Kaisa Häkkinen, Suomen kielen vanhimmasta sanastosta ja sen tutkimisesta. Suomalais-ugrilaisten kielten etymologisen tutkimuksen perusteita ja metodiikkaa (Turun yliopiston suomalaisen ja yleisen kielitieteen laitoksen julkaisuja 17. Turku 1983), p. 392.

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elements disappear with time from a language, the linguistic material necessary to explain certain names can also disappear. Therefore, there is no need for the names in question to be substrate names although it is known from other contexts that names based on substrates have survived even longer than four millennia.[34]

Häkkinen appeals above all to C.F. Meinander's long Tvärminne symposium article for support of her Comb Ware hypothesis.[35] Meinander accepts the continuity from the Mesolithic Period to the Early Comb Ware period on one hand and from the Typical Comb Ware period to the recent times in other hand. He considers the Typical Comb Ware (with some reservations, however) as the actual stage of the Finnish migration.[36]

I am not ready to accept all of Meinander's arguments. He is, without doubt, right in respect to the numerous innovations introduced at the beginning of the Typical Comb Ware stage. On the other hand, he is unable to demonstrate convincingly – actually not at all – two fundamentally important factors: 1. Where was the center of expansion and what were the factors behind the necessary population expansion over large areas during a rather short time? 2. What were the migration routes of the assumed migration and how is their existence proven archeologically? As long as these questions cannot be answered convincingly, we have only one alternative left: that the innovations and cultural influences spread through diffusion. I consider this alternative as a more probable one and maintain that the enrichment of culture, population growth, as well as expansions into new regions that occurred during the Typical Comb Ware culture had local origins. Although there is no doubt that numerous migrations of tribes and people have occurred during the prehistory, explaining all cultural changes automatically as results of migrations is comparable to saying that the fact that microcomputers that are so common in Finland indicates recent immigration from the United States of America. There was a period of large folk migrations in prehistory, but it had not yet started.

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[34]See for example, Aigeialainen substraatti kreikkalaisissa paikannimissä. Fritz Schachermeyer, Die ältesten Kulturen Griechenlands (Stuggart 1955), p. 239-64.

[35]Häkkinen, Esihistoria, p. 118.

[36]Meinander, Väestöhistoria, p. 35-39.

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I primarily argue that there was no massive population movement from the Volga Bend to the Baltic Sea. Intense mutual influences and trade relations that took place along excellent water courses at that time as well as during earlier and later periods were an entirely different matter.[37] Founding arguments on the Typical Comb Ware is the last desperate attempt from the linguistic point of view to stick with the assumed small-sized Volga-Urals homeland. As has already been demonstrated in this paper, it is about time to toss the view that the Baltic-Finns and other Finno-Ugrians migrated from the Volga Bend into the garbage can with other old legends.[38] There is no doubt that discarding this legend would result in great difficulties for linguists of the traditional school of thought, but I am certain that they will demonstrate flexibility with time as they were able to demonstrate when the migration theory collapsed and they had to abandon the hypothesis of entirely too recent a migration into the Baltic region and from there to Finland. This traditional view-construction was repeated with deep authoritative voices and with "stout scientific arguments," and its chronology was considered very precise. In addition to all of this, we still must ask – if we stay with the Volga hypothesis – from whence the Finno-Ugrians arrived in the Volga River area.

Of the representatives of the third view, or theoretical orientation, one must mention above all Torsten Edgren. Edgren does not mention the problem of the Finns' origin in his comprehensive work on the Finnish Stone Age.[39] As excellent as Edgren's book is in a general sense with its artifact descriptions and other purely archeological material, it is incomplete in respect to the handling of most important problems and, therefore, represents the purely descriptive research approach. Since Edgren may have been criticized for this shortcoming, he corrected it in his later comprehensive review (of the entire prehistoric period)[40] by including

[37]Aarne A. Koskinen, Uraalin alkukodista etnohistorian kannalta (Hist. Aik. 58/1960), p. 62. For more information about the waterways, see for example also Armas Luukko, Pohjois-Pohjanmaan ja Lapin keskiaika sekä 1500-luku (Pohjois-Pohjanmaan ja Lapin Historia II. Oulu 1967), p. 23; Kyösti Julku, Oulujokilinja karjalaisen kaukoliikenteen väylänä keskiajalla (Studia Historica I. Oulu 1967).

[38]Milton Nuñez ja Jussi-Pekka Taavitsainen, Keitä ja mistä (Suomalaisten tarina. Ed. Jaakko Itälä. 1. Heräämisen aika. Jyväskylä 1993), p. 20.

[39]Edgren, Kivikausi.

[40]Edgren, Den förhistoriska tiden.

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"information boxes" written by Christian Carpelan in which Carpelan discussed the central ethnicity-related topics.[41] Of course, this is one way to write about the past, but we cannot consider it as quite problem-solving focused and explanatory study of history even with the best intentions. This solution of Edgren also received an irritated reaction[42] because separate information boxes cannot replace the lack of problem-solving orientation in the main text. Neither work can be considered as capable of fulfilling the basic criteria of genetic study of history, although they include – as has already been mentioned – a tremendous quantity of accurate information on artifacts and their descriptions. However, this cannot be the goal in the study of history. Within the field of history, it would mean the same as an accurate description of the sources. Archeology, after all, is the study of history (from artifacts), which can reach high scholarly standards, as demonstrated by Matti Huurre with his book, *9000 Years of Finnish Prehistory.*

The Roots of the Finno-Ugrians

The entire problem must be approached and has now been approached from an entirely different, broader, and more general view. Pioneers of this study include above all Tadeusz Sulimirski[43] from Poland, Russian-born professor Paul M. Dolukhanov[44] in England, Milton Nuñez[45] a Cuban-American(-Finnish) professor of archeology at the University of Oulu, Finland, Hungarian professors Gyula Läszló[46] and János Makkay[47], and Russian geologist D.D. Kvasov[48], all representing archeology, as well as Kalevi Wiik[49] a professor in the University

[41]For example, Christian Carpelan, Östersjöfinnarna, p. 112-15.

[42]Jouko Vahtola, Pitkästä aikaa suomenruotsalainen yleisesitys Suomen historiasta (Hist. Aik. 91/1993).

[43]Sulimirski, Prehistoric Russia.

[44]Dolukhanov, Ecology.

[45]Nuñez, Model.

[46]Gyula László, östörténetünk legkorábbi zakaszai. A finnugor östörténet régészeti amlékei a Szovjetföldön (Budapest 1961).

[47]Makkay János, New aspects of the PIE and the PU/PFU Homelands: Contacts and frontiers between the Baltic and the Ural in the Neolithic (Congressus Septimus Internationalis Fenno-Ugristarum 1 A. Debrecen 1990).

[48]D. D. Kvasov, The Late-Quaternary history of large lakes and inland seas of Eastern Europe (Annales Academiae Scientiarum Fennicae A III 127. Helsinki 1978).

[49]Kalevi Wiik, The Baltic Sea prosodic area revisited (Castrenuanumin toimitteita 49. Helsinki 1995); Põhja-Euroopa rahvaste ja keelte päritolu küsimusi

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of Turku, Finland, Hungarian professor János Pusztay[50], Ago Künnap[51] a professor from Tarto, Estonia, and professor Pekka Sammallahti[52] in Oulu, Finland, all representing linguistics.

These researchers cannot be ignored with a mere shrug as, for example, Kaisa Häkkinen has done recently: "Recently certain archeologists and geneticists, for instance, P.M. Dolukhanov, Milton Nuñez, and Luigi Cavalli-Sforza, have proposed that one could search for the Finns' roots among those European populations who expanded over the territory freed from under the continental ice sheet right after the Ice Age, and this idea has received support also from certain linguists (see Sammallahti 1993 for more details). According to the bravest imaginations (Wiik 1995), populations inhabiting the entire northern Central Europe including the North Sea

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(Keel ja Kirjandus 9/1996); Risto Lindstedt, Suomalaisten juuret. Uutta lähtöruutua etsimässä (Kalevi Wiikin haastattelu. Suomen Kuvalehti 9/28.2.1997); Kalevi Wiik, käsikirjoitukset: Itämerensuomalaisten kansojen ja kielten syntykysymyksiä A. Aikaisempia tutkimuksia (Turku elokuu 1995); B. Uusia kontaktiteoriaan perustuvia ratkaisuja (Turku lokakuu 1995); C. Antropologinen ja geneettinen näkökulma (Turku joulukuu 1995); Missä itämerensuomalaisten eteläraja on aikaisemmin ollut? (Turku huhtikuu 1997); The Uralic Phonetic Substratum in Proto-Germanic (Turku maaliskuu 1997). See also Norbert Strade, Uralisch, Germanisch, Alteuropäisch – über die früheste Sprachgrenze in Nordwesteurasien (Congressus Octavus Internationalis Fenno-Ugristarum 10.-15.8.1995. Pars II. Jyväskylä 1995). It should be noted that Wiik studies only phonetic substratum. However, the Germanic languages also include other substrates that have been studied only little so far. See, however, Franz Nikolaus Finck, über die Möglichkeit eines fenno-ugrischen Substrats in den germanischen Sprachen. See also Franz Nikolaus Finck, Der deutsche Sprachbau als Ausdruck deutscher Weltanschauung. Acht Vorträge (Marburg 1899), p. 40, 62. See also Frederik Kortlandt, Eight Indo-Uralic verbs? (München Studien zur Sprachwissenschaft 50/1989).

[50]Pusztay, János, Über die Vorgeschichte der uralischen Völker. Kansainvälisen symposiumin materiaalia 14.-16.10.1993, Szombathely. (Specimina Sibirica X. Savariae 1994); Pusztay, Diskussionsbeiträge zur Grundsprachenforschung. (Beispiel: das Protouralische). (Veröffentlichungen Societas Uralo-Altaica 43. Wiesbaden 1995).

[51]Ago Künnap, for example, Mea culpa, aga omakeelsed Eesti poliasukad oleme olnud ehk juba 12000 aastat (Keel ja Kirjandus 8/1996). See also the presentation in Szombathely 10.10.1996; a manuscript, Euroopan kielellisgeneettinen tilanne noin vuonna 6000; a manuscript, A Map in Disguise, Encyclopedic Spirit and Black Eve. The Newest Views in Uralistics (manuscript 1996); Maakaart maskis, Taas uurali asjust (Akadeemia. Eesti Kirjanike Liidu Kuukiri Tartus 8/1996).

[52]Pekka Sammallahti, Saamelaisten alkuperästä (14.5.1990. Academia Scientiarum Fennica – Vuosikirja 1990-1991. Helsinki 1991); Suomalaisten ja saamelaisten juuret (Kieliposti 1/1993); Language and Roots Congressus Octavus Internationalis Fenno-Ugristarum 10.-15.8.1995 Jyväskylä. Pars I Jyväskylä 1995).

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coast and the British Isles would have been Proto-Finno-Ugric-speaking. However, it has not been possible to provide these ideas with any systematic linguistic evidence."[53] Häkkinen's comments themselves are left rather incomplete and short – actually they are unsubstantiated claims. One simply cannot sweep aside the newly emerged direction of research that is being pushed forward with a broad front. When I mentioned this polemic in Hiidenkivi,[54] Häkkinen did not make a public response, but sent me a private letter in which she defended the matter by mentioning that Eve Mikone presents a detailed critique in *Virittäjä*. That is what Mikkone did,[55] but only from linguistic and genetic point-of-views. Wiik demonstrated in the next publication of *Virittäjä* that each of Mikone's arguments were based on misunderstandings.[56] The debate continues.[57] Häkkinen's and Mikone's thinking indicates their stubborness to hold onto the ancient ideas that have grown into them and which cannot even be discussed in their opinion. This is spiritually related to a recently published prehistory of Norrland, where the roles of the Saami and especially the Finns are limited to an entirely obligatory part and the most central problems (in Norrland's prehistory) are not even mentioned.[58] The view is entirely Swedish nationalistic.

Before I discuss the most recent research, there is a reason to point out certain ideas presented already long ago, which have been later forgotten for one reason or another. (There is no space for any systematic historicism in this context).

As early as 1899, a German, F.N. Finck, presented the idea that the Indo-European languages contain certain evidence of

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[53]Häkkinen, Esihistoria, p. 74-75.

[54]Kyösti Julku, Suomalais-ugrilaisten alkuperä (Hiidenkivi 6/1996), p. 37.

[55]Eve Mikone, Suomalais-ugrilaisia kieliä puhuvan väestön alkuperä (Virittäjä 3/1996).

[56]Kalevi Wiik, Alkuperäiset ajatukseni (Virittäjä 4/1996).

[57]Eve Mikone, Tutkijan taustasta riippumatonta kritiikkiä (Virittäjä 1/1997); Petri Kallio, Uralilaisten alkuperä indoeuropeistisestä näkökulmasta (Virittäjä 1/1997); Ago Künnap, Uralilaisten kielten jäljistä indoeurooppalaisissa kielissä (Virittäjä 1/1997). Mikone repeats her old misunderstandings. Kallio does not appear to have yet understood the basic fact that today the research must be performed by taking in account many different fields of research and international research. Künnap follows the spear head of the most current research from an international point of view.

[58]Evert Baudou, Norrlands forntid – ett historiskt perspektiv (Wiken 1992).

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the Finno-Ugric languages.[59] This claim has later surfaced very many times,[60] but it has always been forgotten for some reason. Julius Pokorny from Austria has presented the most important of these claims. Pokorny presented his hypothesis already in 1936 of events that took place in the northern regions. He was an extremely precise researcher of the linguistic substrata, and although he mainly concentrated on substrates left in the Indo-European languages of Western Europe, he published his 1936 article "Substrattheorie und die Urheimat der Indogermanen."[61] After he determined the existence of the Finno-Ugric (Uralic) substrate in the Baltic and Slavic languages, he also found it in the Germanic languages. Pokorny concluded that: "It is correct to search for the Finno-Ugric origin in the lower Kama-, central Volga and central Urals, and it is correct that the immigration of the Finns into the Baltic region could not have occurred long before the middle of the first pre-Christian millenium, but this issue deals with the second push of these people toward the west where they encountered an ethnically-related substrate (people?), which we could probably call the Proto-Uralic.[62] These Proto-Uralians would have been very small in numbers, and because we must consider them culturally as very simple nomadic hunters, there is no wonder they have not left any marks in the geographic names, nor in the vocabularies of forward pushing Indo-Germans and Balto-Slavs."[63]

These "Proto-Uralians" left a substrate in the phonetics and structure (morphology) of the languages according to Pokorny. After deliberation, Pokorny concluded: "The above mentioned provides a conclusion that there are only a few things that indicate the existence of a substrate in respect to the language as a whole, but these indicate with a considerable probability their ancient relations with the Finno-Ugric languages."[64]

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[59]Finck, Sprachbau, p. 40, 62. See also, for example, W.B. Lockwood, Indo-European Philology. Historical and Comparative (London 1969).

[60]See, for example, W.B. Lockwood, Indo-European Philology. Historical and Comparative.

[61]Julius Pokorny, Substrattheorie und die Urheimat der Indo-Germanen (Mitteilungen der Anthropologischen Gesellschaft in Wien LXVI/1936). A new edition in volume: Die Urheimat der Indogermanen (Hrsg. Von Anton Schereer. Darmstadt 1968).

[62]Pokorny, Substrattheorie, passim.

[63]Pokorny, Substrattheorie, p. 184-85.

[64]Pokorny, Substrattheorie, p. 204.

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An overview of the situation is as follows: Because Pokorny must have accepted as proven facts Wiklund's (he only referenced Wiklund), Setälä's, and other Finno-Ugrists' ideas of a recent migration from the assumed Kama and Volga Bend area of origin toward the west first to the Baltic region and then to Finland, he had to presuppose the existence of an earlier-arriving Finno-Ugric people, not only in the later Baltic-Finnish territory but also elsewhere. Now, when we can consider the settlement continuity theory as a proven fact, there is no longer any reason to assume two waves of population movements of the Proto-Uralic people. It must be noted, however, that Pokorny accepted not only the multi-directionality of the linguistic- but also cultural influences.[65]

Even before the breakthrough of the continuity theory – during the rule of the migration theory – there was a scattering of Finnish researchers who thought heretically and whose ideas did not agree with the ruling consensus. Julios Ailio[66] has already been discussed. He built primarily on the ideas of the German Gustaf Kossina. He was not the only skeptic. Kustaa Vilkuna was deliberating until 1948 with a special problem that there was actually no evidence of the recent massive westward migration of the Finno-Ugrians people to the Baltic region presupposed by the supporters of the traditional school of thought. According to him, all evidence pointed to areas further south in the Baltic region.[67] Exactly ten years later in 1958, Aarne Äyräpää considered the earlier Stone Age inhabitants as Finno-Ugrians, although at the same time he accepted the migration of the Finns from Estonia to Finland. He wrote: "These (Antrea finds) belong to the Boreal period culture, whose territory stretched from England to the Urals, and which was characterized by the abundant use of bone and antler artifacts, increasing use of stone axes, and settlement sites located along small lakes. This culture is known as the Maglemose culture after a certain Danish site. The Antrea finds belong to this culture's eastern branch, which is known as the Kunda culture after a site in northern Estonia."[68] It is not possible to state this better than he

[65]Pokorny, Substrattheorie, p. 185.
[66]Ailio, Hämeen linna; Ailio, Alkukoti.
[67]Kustaa Vilkuna, Vanhimmat suomalais-slaavilaiset kosketukset ja suomalaisten esihistoriaa Itämeren partailla (Kalevalaseuran vuosikirja 27-28/1948).
[68]Aarne Äyräpää, p. 19.

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did.

Äyräpää's other ideas also point in the same direction: "We have now arrived in the most find-rich period of our Stone Age, the so-called Comb Ware culture (about 3000-1750 BC). It descends through the Suomusjärvi ultimately from the Kunda culture.[69] Äyräpää clearly supported the continuity theory here. He has also other quite modern-like views: "But the elements of the earliest Comb Ware appear to have been brought into Finland by a cultural diffusion following the Dnieper from southern Russia, from where terra cotta human figures (Figure 12a) and the Karelian pick-axes (Figure 7e) were also adopted. Later the eastern contacts were the most prominent and, especially toward the end of the Comb Ware period, a wave of cultural influences and possibly new immigrants arrived in Finland and the Baltic countries from the central Russian heartland of the Comb Ware culture. This new wave brought with it plenty of flint as well as new features in clay vessels. The style we call as the "Typical Comb Ware" was born as a result of these influences..."[70] Now, we must note here how cautiously Äyräpää wrote about "possible" immigration. His text also includes a small mistake. The flint in question was from the Valdai region, to be precise, and not from further east (there was also flint from south of Lake Onega). It is most important to note how Äyräpää emphasized the Dnieper-Valdai line.

These topics were also deliberated upon outside Finland. In general, however, the ideas from outside Finland were ignored for a long time. For instance, Kivikoski knew about Gordon Childe's work on the prehistoric migrations in Europe,[71] but she did not know about his 1926 work on the Aryans in which Childe considered the Finno-Ugrians to be the original inhabitants of the entire northern Europe.[72] Similar views were also presented elsewhere. The German, Kossina, deliberated upon the problem of the Indo-European homeland in many of his works, and doing that he arrived at the conclusion that the original homeland of the Finno-Ugrians would have reached northern Germany and Scandinavia. These original inhabitants

[69]Äyräpää, p. 21.
[70]Äyräpää, p. 24.
[71]Kivikoski, p. 8: Compare with V. Gordon Childe, Prehistoric migrations in Europe (Instituttet for sammenliggende kulturforskning A XX. Bergen 1950).
[72]Childe, Aryans, passim.

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would have been assimilated during the Germanic expansion and the people of the so-called Slate-Stone culture of northern Sweden would have been the last representatives of these aboriginal North Europeans.[73]

Swedish Oscar Almgren presented similar views based on Kossina's hypothesis already in 1914.[74] According to Almgren, the entire northern region from the Vistula to the Urals and to Ruija in the north would have been part of the Finno-Ugric core area. Later in 1942, another Swede, Erik Rhedin, made similar claims in light of language and place names.[75] It is possible that Rhedin was silenced to death. At least one of his articles circulates as a manuscript.[76]

In Finland, however, the mainstream of research continued along the traditional channels. Especially Mikko Korhonen[77] and Jorma Koivulehto[78] have made noticeable contributions. Their research – although innovative – was still based on the ancient approach that the fundamental problem is to detect the Indo-European loans in the Finno-Ugric languages. Only Kalevi Wiik has considered this problem as a two-way phenomenon in

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[73]See reference 22.

[74]See reference 12. Almgren.

[75]Erik Rhedin, Folk och språk i Norden (Nordisk Tidskrift 18/1942). I thank Prof. Kalevi Wiik about information about Rhedin..

[76]Erik Rhedin, När blev Sverige germanskt? (manuscript s.a.).

[77]Mikko Korhonen, Oliko suomalais-ugrilainen kantakieli agglutinoiva? Eli mitä historiallisista rekonstruktioista voidaan lukea ja mitä ei (Virittäjä 1974); Suomen kantakielen kronologiaa (Virittäjä 1976); Suomalaisten suomalais-ugrilainen tausta historiallis-vertailevan kielitieteen valossa (Suomen väestön esihistorialliset juuret); Remarks on the structure and history of the Uralic case system (SUSA 83/1991).

[78]Jorma Koivulehto, Vanhimmista germaanis-suomalaisista lainakosketuksista. Sm. karsia – germ. skardian (Virittäjä 1971); Vanhimmista germaanisista lainakosketuksista ja niiden ikäämisestä (Virittäjä 1976); Baltisches und Germanisches im Finnischen: die finn. Stämme auf -rte und die finn. Sequenz VrtV (Explanationes et Tractationes Fenno-Ugricas in Honorem Hanns Fromm. Ed. Erhard F. Schiefer. München 1979); Lainoja ja lainakerrostumia (Virittäjä 1979); Seit wann leben die Urfinnen im Ostseeraum? Zur relativen und absoluten Chronologie der alten idg. Lehnwortschichten im Ostseefinnischen (Symposium Saeculare Societatis Fenno-Ugricae. SUST 185/1983); Suomalaisten maahanmuutto indoeurooppalaisten lainojen valossa (SUSA 78/1983); Itämerensuomalais-germaaniset kosketukset (Suomen väestön esihistorialliset juuret); Germaaninen filologia ja kansalliset tieteet (Virittäjä 1984); Suomen kielen indoeurooppalaiset lainasanat ja indoeurooppalais-uralilainen alkusukuongelma (Academia Scientiarum Fennica. Vuosikirja 1992-1993); Zur indogermanisch-germanischen Kontinuität in der Nachbarschaft der Finnougrier – Der Gingo Baum (Germanistisches Jahrbuch für Nordeuropa 13. Folge. Helsinki 1994-1995).

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light of recent international archeological research. One must, of course, ask whether Wiik's hypothesis is right. One can, however, refer to the researchers of whom I mention those already discussed: Finck, Pokorny, Lockwood, and Kortland. As to the last mentioned one, one can think that: If the substrate theory is proven right in case of the Indo-Europeans as a language family, it would be peculiar if it could not be proven also in the case of individual Indo-European languages.[79]

The foundation for the new approach was laid by Paul M. Dolukhanov's book *Ecology and Economy in Neolithic Eastern Europe*, published in 1978.[80] Above all, to his credit is the demonstration of how the human settlement actually drifted. Milton Nuñez based his analyses of the origin of Finland's earliest settlement on Dolukhanov's views.[81] Nuñez's analyses demonstrates most clearly the basic fact that since the direction of the settlement expansion was primarily from south-to-north and there were no large Upper Paleolithic settlement concentrations in the Volga Bend region, the Baltic-Finnish settlement could not have arrived from the east.

Dolukhanov also contributed to the discussion of Nuñez's article in 1989.[82] Dolukhanov argued that there were two primary settlement zones in the late Upper Paleolithic Europe. He named the western one as the Mediterranean zone and the eastern one as the periglacial zone. He considered the last mentioned zone as the Finno-Ugric one. It is appropriate to return to Aarne Äyräpää's ideas from 1958 at this point. Äyräpää considered the Maglemose- and the Kunda cultures as one and the same culture. The Kunda culture was simply the eastern variant of the Maglemose culture. Äyräpää's ideas have proven to be prophetic.

Dolukhanov based his conclusions on two points. First, he refers to the typological facts noted by Koslowski[83], with whom I

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[79]See reference 48. Kortlandt.

[80]Dolukhanov, Ecology.

[81]Nuñez, Model.

[82]Dolukhanov, Prehistoric ethnicity.

[83]Janus K. Kozlowski, The Gravettian in Central and Eastern Europe (Advances in World Archaeology 5 / New York 1986), passim and especially p. 192-94. About Ukraine's Paleolithic period see also Olga Soffer, The Upper Paleolithic of the Central Russian Plain (Academic Press, USA 1985). There is naturally a lot of Russian literature dealing with this topic. I only refer to the most recent one: H.D. Praslov, V.E. Selinskij, Vernepaleolititéeskoe poselenie zolotovka I na niznem Dony

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have to agree. Second, he refers to the linguistic studies of Hubschmid from Germany. I cannot quite agree with this one, because in reality Hubschmid considers it only possible that there was a syntactic connection between the Basque and the Finno-Ugrian languages. Hubschmid does not consider it as a fact.[84]

The situation has now changed. Michel Morvan from France published his dissertation on the origins of the Basque language in 1996.[85] Morvan arrived at the following conclusion: "What we have said all along is that the Basque language is related to the Uralic-Altaic languages, but it is not a member of the Uralic-Altaic family, which is an entirely different thing." I would moderate this statement somewhat (and also expand it) in the following way: Based on Morvan's data, one can assume that there were contacts between the Basque and the Uralic-Altaic languages, but there were also such contacts with other language families, for example, with the Caucasian languages, and even with languages located much further in the east. This indicates the great antiquity of the linguistic relationships of the Basque and other languages. A more detailed discussion belongs to paleolinguists. In any event, it is now clear that the Basque can no longer be considered a completely isolated language, as it has often been considered, but that its roots connect with those of other languages during the period when *Homo sapiens sapiens* had not yet dispersed to different directions: Europe in the west and Asia in the east.

In this context, it is necessary to discuss Dolukhanov's idea of the two Glacial Maximum refugia areas. In reality, there were three such areas. The eastern refugium area in Ukraine was connected with the western one in Franco-Cantabria by a more sparsely inhabited territory but nevertheless a refugium, which included primarily some parts of Hungary and eastern Austria. Important sites include, for instance, Pilismaröt-Pálrét, Polismaröt-Diós, Dömös, and Sägvär in Hungary, and Grubgraben and Willendorf as well as sites west of the Morava

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(Santpeterburg 1996).

[84]Johannes Hubschmid, Mediterrane Substrate mit besonderer Berüksichtigung des Baskischen und der west-östlichen Sprachbeziehungen (Romanica Helvetica 70/Bern 1960), p. 40.

[85]Michel Morvan, Les origines linguistiques du basque (Aubenas d'Ardéche 1996), p. 272.

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River in Austria.[86] There were contacts between this central refugium and the Franco-Cantabria in the west and the eastern, or Ukrainian, refugium in the east.[87]

This is not all, because there are as many as three caves in the southern Urals that exhibit the same form of paintings as the famous caves in France and Spain. These caves are Kapovaja, Ignatiev, and Spievka 2. The connection with the cave paintings in the west is so unquestionable that there is a reason to speak of a continuous culture zone, which stretched from Spain through southern France and Central Europe to the central Urals during the late Upper Paleolithic period.[88]

There is more evidence. The Norwegian and Swedish rock paintings have been known for a long time by researchers. The majority of the rock carvings from Lake Onega and Viena and both rock carvings and rock paintings from the Kola Peninsula are entirely new discoveries. I am not able to go through this evidence in detail in this context due to lack of space, therefore, I must limit myself to refering only to the most important points. First of all, there is a clear genetic connection of the oldest rock art of all northern regions with the Franco-Cantabrian cave paintings, the date of which decline is commonly dated to 10,000 BP. In other words, this is the date after which the earliest rock art appeared in the north with some delay. The magical symbols are also the same: a human dressed in animal skins to be a shaman, palm prints, "traps" and so forth. Also, the style and size of the earliest rock art point clearly to its cave painting models.[89]

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[86]See especially Dixie West, Hunting strategies in Central Europe during the Last Glacial Maximum (BAR Int. Ser. 672. Oxford 1997). There is a plenty of literature. Compare, for example, Anta Monter-White, The Epigravettian Site of Grudgraben, Lower Austria: The 1986 and 1987 Excavations (ERAUL 40. Liége s.a.).

[87]West, p. 130-31.

[88]Paul G. Bahn and Jean Vertut, Journey through the Ice Age (London 1997), passim. There is a plenty of literature specialized on this topic. See above all, Valéri Petrine, Le Sanctuaire paléolithique de la Grotte Ignatievskaïa á l'Oural du sud (ERAUL 40. Liege 1997) and literature cited in this work.

[89]Of the available literature, I only mention the following: Gutorm Gjessing, Arktiske helleristninger i Nord-Norge; Gjessing, Nordenfjelske ristninger og melinger av den arktiske gruppe (Instituttet for sammenliggende kulturforskning. Serie B: Skrifter XXI, XXX, Oslo 1932, 1936); Gustaf Hallström, Monumental Art of Northern Europe from the Stone Age. I. The Norwegian Localities; Monumental Art of Northern Sweden from the Stone Age. Nämforsen and Other Localities (Collotype Plates: Norway, Sweden) (Stockholm 1938-60); Haakon Scheteling &

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The only problem is the geographical and chronological gap. No rock carving has been discovered so far from the North German Plain, Denmark and Finland. The physical conditions may, however, explain this gap. The reason may be the accumulation of sediment layers in northern Germany and Denmark, and the Mesolithic sites are commonly found under these layers. In Finland, the Mesolithic sites were abandoned due to the uplift of the ground and, therefore, these sites are easily reached. Instead, the forestation has left very few rock surfaces that were bare 6000-10,000 years ago uncovered, therefore, hiding possible rock carvings. It would be peculiar if Finland was really a zone devoid of rock carving art between the Scandinavian rock art area in the west and the Lake Onega-Viena-Kola rock art area in the east. Finding rock carving is also a matter of luck in these areas, and searchers have not yet been lucky. In general, there are no empty areas in prehistory. There are empty areas only in researchers' knowledge.

There is another possibility of course. Especially Paul G. Bahn[90] has indicated in his recent studies that the rock painting and rock drawing art were universal. If this is the case, we could consider the northern rock painting art which extents from Scandinavia far away into northern Siberia as a rather homogenous zone in respect to its form and content as having originated spontaneously. This problem cannot yet be

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Hjalmar Falk, Scandinavian Archaeology (New York 1978), p. 98-121 (by Schetelig); Paolo Graziosi, Palaeolithic Art (London 1960); André Leroi-Gourhan, The Art of Prehistoric Man in Western Europe (Translated from the French by Norbert Guterman. Thames and Hudson – London 1968). Even the most recent comphrehensive works on the ancient art do not know finds from Karelia and the Kola Peninsula, which must have clear contacts with the Paleolithic period cave art of western Europe. See Andreas Lommel, Esihistoriallinen ja primitiivinen taide (Landmarks of the World's Art / Prehistoric and Primitive Man. Translated into Finnish by Raija Mattila. Helsinki 1967), p. 23-46. See also Eero Autio, Karjalan kalliopiirrokset (Keuruu 1981); Pekka Kivikäs, Kalliomaalaukset – muinainen kuvaarkisto (Jyväskylä 1995); Markku Korteniemi, Poropeuran ja hirven jäljillä – La Madelainesta Kainuuseen ja Karjalaan (Rajamailla II/1996), p. 184-85. The following are especially important ones: Väinö Poikalainen – Enn Ernits, Rock Carvings of Lake Onega. The Vodla Region (Tartu 1998). This work discusses only some of the Lake Onega rock carvings. Poikalainen kindly allowed me to become familiar also with the material he has not yet published, for which I humbly thank him. Poikalainen is in the process of filling with his work an enormous gap in our information, and what is the best, he is also able to view the topic in a large context. See also V.A. Ovorin, G.N. Tsagin, The Ancient Animal Style of Perm (Permskoe Kniznoe Izlatelstvo 1988), p. 16.

[90]Bahn, p. 27-47.

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considered as solved in respect to all details although Bahn's hypothesis as a whole has been accepted.

If we take into consideration the fact that the so-called Swiderian culture – the roots of which lead to the mammoth-hunting cultures of the south – of the eastern Central Europe has been considered as Finno-Ugrian and remember that the North Sea "Land" (which was dry land during the Ice Age) including eastern England was inhabited by the Maglemose culture, we can begin to determine the area where the periglacial Finno-Ugrians lived. This area included rivers discharging their waters in the Black Sea and their banks, and in the west it extended to the Canal coast and eastern England.

Based on the above, we could consider the Ukraine, excluding the Black Sea coast, and neighboring regions in the west and north of the Danube as the original Finno-Ugric homeland. This can also be stated as follows: During the Glacial Maximum, about 18 ky BP, there was a retreat of settlement from northern regions where it had spread during the preceding period. When the land started to become once again free of ice in the north about 13 ky BP, the game followed the ice border to the north and people followed their game, as Sulimirski has described earlier. This is how the above mentioned situation emerged.[91] We only have to ask whether the people who had lived in the Glacial Maximum "reservations" around 18 ky BP were Finno-Ugrians or should we use the term Proto-Finno-Ugrians. Nothing else is logical. Of course, one must note that we are now discussing such ancient events that not even the paleolinguistic methods are sufficient.

In any event, the end result is that the Finno-Ugrians represent the eastern branch of the European Cro-Magnons. It is very much worth noting that international research of population genetics, modern physical anthropology, and new archeology all point in the same direction, and with some reservations also linguistics dealing with more recent events. This cannot be a coincidence.

Because it can be proven that several (groups of) languages have disappeared already during historical times (for example,

[91]See Clive Gamble, The Palaeolithic Settlement of Europe (Cambridge 1986), p. 212-16. See also M. Dolukhanov, Évolution des systèmes écosociaux en Europe durant le pléistocène récent et le début de l'holocéne (La Fin des Temps Glaciaires en Europe. Ed. D. de Sonneville-Bordes. Paris 1979).

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Old Prussian, Merja, and Muroma), one may perhaps assume that the same has also occurred during the prehistoric millennia. Of course, we cannot even start to argue about events that have left absolutely no evidence. Few substrates of ancient languages have, however, survived. In the case of northern Europe, the most important is the unknown language, which left so many marks in the Germanic languages that even 30 percent of the words in German are thought to derive from it. These substrate words in the German language deal primarily with social organization, sea, and seafaring, as well as with warfare. Some of the words have been borrowed also into Finnish: for example, *kuningas* (king). According to the traditional explanations, this word is considered a Germanic loan, although it could be equally well a common loan in both Germanic and Baltic-Finnish languages.[92]

The Roots of the Indo-Europeans

If János Pusztay's idea of the chain-like homeland of the Finno-Ugrians is proven right in respect to the short time interval – I mean the last 10,000-15,000 years with the short time here – one could assume that it is also true in case of the Indo-Europeans.[93] In that case,we would not search for a dot-like homeland – as is done, for example, by Lundman in Sweden and Renfrew in England – nor would we date this homeland to the near past – as Gimbutas and Kilian are doing, for example – but we would search for a chain-like homeland in the more ancient past.

Of course, we can respond by saying that this is just a hypothesis. For my part, I will respond by turning Newton's famous argument, *Hypotheses non fingo,* around and argue the *Hypotheses Fingo.* I consider it my responsibility as an historian to try to find a way out of a dead end situation through which I or someone else could get forward. I am, of course, purely a historian and my only wish is that I would not belong to that

[92]Astrid Stedje, Deutche Sprache gestern und heute: Einführung in die Sprachgeschichte und Sprachkunde (München 1989), p. 43; Erika Sausverde, "Seewörter" and Substratum in Germanic, Baltic and Baltic Finno-Ugrian Languages (The Indo-Europeanization of Northern Europe, ed. By Karlene Jones-Bley and Martin E. Huld. Journal of Indo-European Studies, Monograph No. 17. Washington D.C. 1996).

[93]For more about this idea, see especially N.S. Trubetzkoy, Gedanken über das indogermanen-problem (Acta Linguistica 1/1939. København).

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rather large category of historians, whose knowledge is limited to historical records. The rest is nothing but deduction with probabilities and improbabilities.

For the above reasons, I came to refer on the other hand to Pusztay's and Trubetzkoy's thought in paleolinguistics as well as Wiik's thoughts which penetrate deeply into our ancient past, and on the other hand to the hypotheses of archeologists Sulimirski, Dolukhanov, and Nuñez of the early stages of the periglacial zone. I also refer to the research of Cavalli-Sforza, Savontaus[94] and Sajantila[95] in genetics and Niskanen[96] in physical anthropology, who all point in the same direction.

If the earlier mentioned idea of the two late Upper Paleolithic period population concentrations is correct, it allows us to eliminate an entire group of hypotheses of the Indo-European origin and homeland.

At first, I want to refer to J.P. Mallory's map where he shows where 14 most recently proposed hypotheses of the Indo-Europeans' origin locate the Indo-Europeans' original homelands.[97] A more productive starting point is, however, Zvelebil's more recent discussion in 1995.[98] Zvelebil considers that there are five different groups of hypotheses of the Indo-European origin that are worth giving serious consideration. Next, I list the proposed Indo-European homelands and their proponents according to my slightly modified version of Zvelebil's classification of the hypotheses of Indo-European origins:

1. Northern Germany and southern Scandinavia, proposed by

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[94]For example, Antti Sajantila et al., Genes and Languages in Europe. An Analysis of Mitochondrial Lineages (Genome Research 5/1995).

[95]As reference 87.

[96]Markku Niskanen, The origins and affinities of the Finns and Saami (Lapps): A multidisciplinary approach, (1994b). A presentation at the American Anthropological Association Annual Meeting. Atlanta 1994. For methods used in Niskanen, see W.W. Howells, Skull Shapes and the Map: Craniometric Analyses in the Dispersion of Modern Homo (Cambridge, Massachusetts 1989).

[97]Mallory, p. 144.

[98]Marek Zvelebil, At the Interface of Archaeology, Linguistics and Genetics: Indo-European Dispersals and the Agricultural Transition in Europe (Journal of European Archaeology 3/1995). Mallory arrived at similar classification in a somewhat later article. See James P. Mallory, The Homeland of Indo-Europeans (Archaeology and Language I. Theoretical and Methodological Orientations. Edited by Roger Blench and Matthew Spriggs. One World Archaeology 27. London and New York 1997).

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H. Hirt,[99] G. Kossina,[100] W. Schulz,[101] H. Seger,[102] J. Pokorny,[103] B. Lundman,[104] and G. Schwantes.[105]

2. Central Europe and the North Balkans, proposed by I.M. Djakonov,[106] V.A. Safronov,[107] P. Bosch-Gimbera,[108] G. Devoto.[109]
3. The steppe region north of the Back Sea, proposed by G. Childe,[110] M. Gimbutas,[111] T. Sulimirski,[112] S. Piggot,[113] J.P. Mallory,[114] Fr. Kortlandt.[115]
4. The three areas above combined, proposed by A. Häusler,[116] L. Kilian,[117] and J. Makkay.[118]

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[99]Herman Hirt, Die Indogermanen. Ihre Verbreitung, ihre Urheimat und ihre Kultur I-II (Strassburg 1905-07). About urheimet, see especially I, p. 176-98.

[100]Gustav Kossinna, Die indogermanische Frage archäologisch beantwortet (Zeitschrift für Ethnologie 34/1902); Der Ursprung der Urfinnen und der Urindogermanen (Mannus 1, 2. Leipzig 1909, 1911); Ursprung und Verbreitung der Germanen in vor- und frürhgeschichtlicher Zeit (Mannus 36/1926); Die Indogermanen. Ein Abriss. I. Teil: Das indogermanische Urvolk (Mannus 26/1921).

[101]Walther Schulz, Die indogermanenfrage in der Vorgeschichtsforschung (Zeitschrift für vergleichende Sprachforschung 62/1935).

[102]Hans Seger, Vorgeschichtsforschung und Indogermanenproblem (Germanen und Indogermanen. Volkstum, Sprache, Heimat, Kultur. Festschrift für Herman Hirt. Hrsg. von Helmuth Arntz. Heidelberg 1936).

[103]Julius Pokorny, Die indogermanische Spracheinheit (Handbuch der Weltgeschichte I. Hrsg, von Alexander Randa. Basel 1954. Here 3. Auflage 1962).

[104]Bertil Lundman, Stammeskunde der Völker (Uppsala 1961).

[105]Gustav Schwantes, Die Indogermanen – Die Urgeschichte (Geschichte Schleswig-Holstein Neumünster 1958).

[106]I. M. Djakonov, O prarodine nositelei indojevropeiskih dialektov I-II (Vestnik drevnei historij 3/1982, 4/1982).

[107]V.A. Safronov, Indojevropeiskie Prarodiny (Gorkij 1989).

[108]P. Bosch – Gimbera, El Problema Indoeuropeo (Mexico 1960); here Les Indo-Européens: Problèmes Archéologiques (Paris 1961).

[109]Giacomo Devoto, Origini Indoeuropee (Firenze 1962).

[110]V. Gordon Childe, The Aryans. A Study of Indo-European Origins (History of Civilization. London 1926).

[111]Marija Gimbutas, The Indo-Europeans: Archaeological problems (American Anthropologist 65/1963); Proto-Indo-European culture: The Kurgan culture during the fifth, fourth and third millenia BC (Indo-European and Indo-Europeans. Eds. G. Gardona, H.M. Hoenigswald and S. Senn. Philadelphia 1970); The first wave of Eurasian steppe pastoralism into Copper Age Europe (Journal of Indo-European Studies 5/1977).

[112]Tadeus Sulimirski, Prehistoric Russia. An Outline (London 1970).

[113]Stuart Piggot, Ancient Europe from the Beginnings of Agriculture to Classical Antiquity (Edinburgh 1965).

[114]J. P. Mallory, In Search of the Indo-Europeans. Language, Archaeology and Myth (London 1989).

[115]Frederik Kortlandt, The Spread of Indo-Europeans (Journal of Indo-European Studies 1989).

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5. The Asia Minor proposed by T.V. Gamkrelidze and V.V. Ivanov,[119] P. Dolukhanov,[120] C. Renfrew[121], and B. Sergent.[122]

I approach this situation somewhat differently than Zvelebil. First, it must be noted that the Indo-Iranian branch of the Indo-European family are given much too little attention in many hypotheses where the Indo-European homeland is located in northern Germany and southern Scandinavia. It is very difficult to consider Germany as the Indo-Iranian homeland. The obvious bias in the northern homeland assumption is also seen in the use of the name Indo-Germanen when referring to the Indo-European language and people. This hypothesis is quite German- and Scandinavian-centric, and it received considerably increased support when the Nazi party gained power. However, its origins are older and its philosophy still survives in a kind of pan-Germanic form. It would be more convincing to use the term Indo-Irish for both geographical and historical reasons than the term Indo-Germanen if the term Indo-European is not accepted.

Because the starting point here is the hypotheses that the Finno-Ugrians' settlement of Europe during the late Paleolithic

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[116]Alexander Häusler, Archäologie und Ursprung der Indogermanen (Das Altertum 38/1992); Über Archäologie und Ursprung der Indogermanen (Wither Archaeology? Papers in Honour of Evzen Neustupny. Praha 1995); Protoindoeuropäer, Baltoslawen, Urslawen. Bemerkungen zu einigen neueren Hypothesen (ZfA Z Archäol 22/1988); Invasionen aus den nordpontischen Steppen nach Mitteleuropa im Neolithikum und in der Bronzezeit: Realität oder Phantasieproduct? (Archäologische Information 19/1996).

[117]Lothar Kilian, Zum Ursprung der Indogermanen. Forschungen aus Linguistik, Prähistorie und Anthropologie. (Habelt Sachbuch. 2. erweiterte Auflage. Bonn 1988).

[118]Makkay, János, Az Indoeurópai népek östörténete (Budapest 1991).

[119]T. V. Gamkrelidze & Vjaté. Vs. Ivanov, Indoevropeiskij jazyk i Indojevropeitsy I-II (Tbilisi 1984); The migration of tribes speaking the Indo-European dialects from their original homeland in the Near East to their historical habitations in Eurasia (Soviet Studies in History 22/1983); The problem of the original homeland of the speakers of related dialects and on the methods of its determination (Vestnik drevnei istorii 1984).

[120]Pavel M. Dolukhanov, Natural environment and the holocene settlement pattern in the northwestern part of the USSR (Fennoscandia Archaeologica 3/1986).

[121]Colin Renfrew, Archaeology and Language. The Puzzle of Indo-European Origins (London 1987).

[122]Bernard Sergent, Les Indo-Européens. Histoire, langues, mythes (Paris 1995).

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and the Mesolithic periods was as shown in Map 1, and that westernmost Europe was settled by people originating from the Mediterranean or Franco-Cantabrian zone (either name can be used as long as the meaning is clear), we should start searching for the Indo-Europeans from south and east of the proposed settlement zones. As a result, only hypotheses proposed by Renfrew, Camkrelidze and Ivanov, Dolukhanov, and Sergent are left from the list of hypotheses provided above. Based on these surviving hypotheses, Marek Zvelebil has developed the so-called creolization hypothesis.[123] Dolukhanov uses the term *lingua franca* when referring to the same phenomenom.[124] In other words, the situation is that the Indo-European dialects spread from their areas of origin very fast and very broadly. If we consider the Indo-European area of origin a similar chain-like homeland to that proposed for the Finno-Ugrians, its eastern part would be represented by the Aral Sea, the Caspian Sea and the Volga estuary in southeastern Russia, its central part would be represented by Anatolia, then its western part the Balkans, and the southernmost central Europe south of the Danube.

Renfrew locates the Indo-European homeland in a very small part of eastern Anatolia (the Hittite territory). The expansion would have started from this region in all directions except to the south. It would have taken 2000 years before the British Isles were reached. This seems impossible, and it is questionable whether it can be proven archeologically. The same is true with other small-sized homeland hypotheses in my opinion. Sergent, for his part, locates the homeland in the Near East closer to the neighborhood of the Afro-Asiatic-speakers.[125]

Although he dates this small-sized homeland to the late Paleolithic Period, its small size still does not seem right. I continue to support the large-sized homeland view.

The European Playing Ground

At the end of the Paleolithic and during the Mesolithic, the European settlement had stabilized in the condition presented by Map 3. This condition remained unchanged through the entire Mesolithic Period. This world, however, experienced a major upheaval when farming emerged, the phenomenon

[123]Zvelebil, Interface, p. 50-60.
[124]Dolukhanov, Cultural, p. 273.
[125]Sergent, p. 434.

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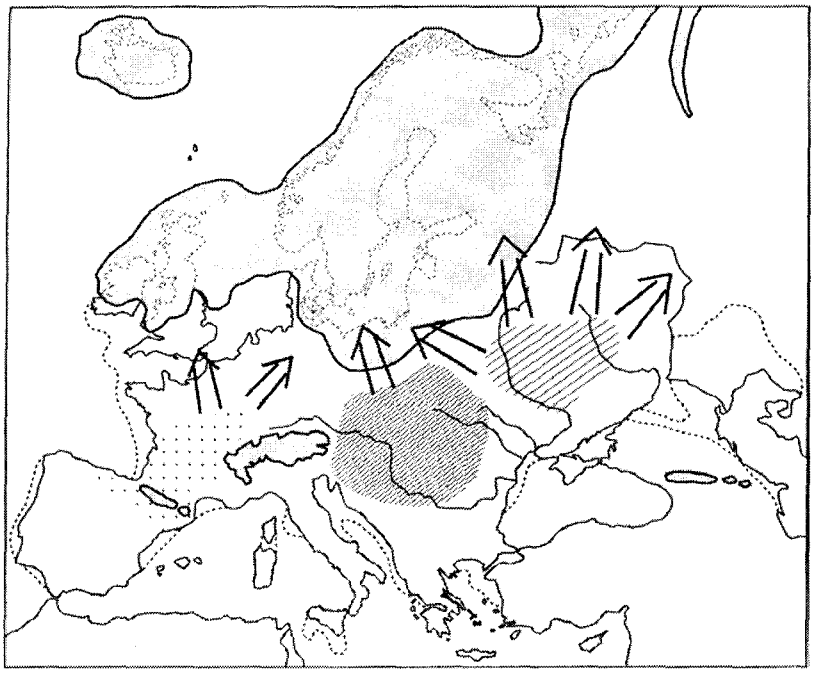

Map 1. The only realistic and logical possibility is to derive the Finno-Ugrian settlement of the periglacial zone from the more ancient past from the refugium located in the Ukraine and the west from it along the banks of the Danube – and in some parts possibly from the Franco-Cantabrian refugium. In between the Ukrainian and the Franco-Cantabrian refugia, there probably was a more sparsely settled refugium, which was composed of – in addition to the banks of the Danube - the modern lower Austria. It has been proven that there were contacts between different settlement centers even during the Last Glacial Maximum (West). During the late Upper Paleolithic period, there was also the fourth settlement concentration in the southern Urals, from where three caves have been discovered. These caves have similar cave paintings to those found in Franco-Cantabria. Therefore, we can assume that when the Last Glacial Maximum was ending during the late Upper Paleolithic period, there was a rather homogenous culture zone reaching from northern Spain to the Urals. (Pavel Dolukhanov, Evolution des systémes éco-sociaux en Europe durant le Pléistocene récent et le début de l'holocene. La fin des temps glaciaire en Europe; sous la dir. De Denise de Sonneville-Bordes. Paris 1979. Collogues internationaux du Centre national de la récherche scientifique, 0356-7634; Clive Gamble, The Paleolithic Settlement of Europe (Cambridge World Archaeology. Cambridge 1986, p. 213; Dixie West, Hunting Strategies in Central Europe During the Last Glacial Maximum (BAR International Series 672, Oxford 1997); See also The Epigravettian Site of Grubgraben, Lower Austria: The 1986 and 1987 Excavations, ed. By Anta Montet White (ERAUL 40, Liége 1990); Jeff T. Williams, Local Organizational Adaptations to Climatic Change. The Last Glacial Maximum in Central Europe and the case of Grubgraben (Lower Austria) (BAR International Series 698. Oxford); Valéri Petrine, Le Sanctuaire Paléolithique de la Grotte Ignatievskaia á l'Oural du sud (ERAUL 81. Liége 1997.))

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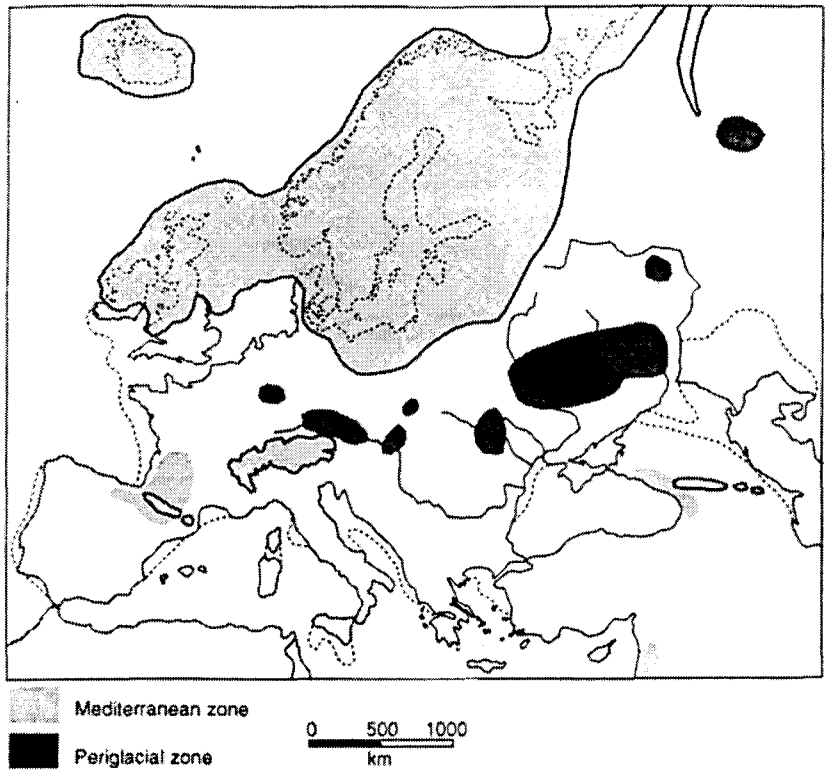

Map 2. The Franco-Cantabrian or 'Mediterranean', and the Finno-Ugrian or 'Periglacial' zones of settlement concentration during the late Upper Paleolithic period, as presented by Dolukhanov (Dolukhanov, Ethnicity, p. 83). Drawn by Jari Okkonen on Milton Nuñez's base map after Dolukhanov.

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called the Neolithic Revolution by Gordon Childe.[126]

Agriculture did not emerge – as we well know – in the large Near Eastern river valleys, but in the upland plains of the Zagros Mountains, in the headwaters of the Euphrates and Tigris rivers, Palestine, and Anatolia around 10,000 BC. Its rate of spread appears to have been slow at first, but it accelerated with time. It brought upheavals in Mesolithic Europe and Asia.

The farming and associated domestication of animals and their breeding was responsible for the expansion of the Indo-Europeans. If we simplify the situation a little, there are two basic models of farming expansion of which Cavalli-Sforza[127] and Renfrew[128], for example, represent one. They argue that farming (and the Indo-European languages) spread with an even process primarily based on emigration. Another extreme position is represent by Gimbutas, for example. She proposes that the spread of the so-called Kurgan culture indicated the spread of (pastoral) Indo-Europeans from their homeland over western Europe.[129] I think that the actual process was far more complex and variable and that we cannot sort out all of its details yet. We may, however, possibly describe its most important aspects.

The task is made considerably more difficult by the fact that it is most obvious that we must associate the spread of farming and the spread of the Indo-European languages. Therefore, we still must return to the Indo-European homeland question. Renfrew,[130] Sergent[131] and Gamkrelidze and Ivanov[132], for example, argue for small-sized homelands. All of these hypotheses must be criticized strongly. I only mention as an example the critique Sergent[133] – who also supports the small-

[126]V. Gordon Childe, What happened in History (Harmondsworth 1942). Here a Swedish translation, Människän skapar sig själv (Uppsala 1954).

[127]A. J. Ammerman & L.L. Cavalli-Sforza, Measuring the rate of spread of early farming in Europe (Man 6/1971); Frontier studies of a population model for the diffusion of early farming in Europe (The Explanation of Culture Change. Ed. Colin Renfrew. London 1973); The Neolithic Transition and the Genetics of Population in Europe (Princeton 1984); Luigi Luca Cavalli-Sforza, Genes, Peoples and Languages (Scientific America 265/1991).

[128]Renfrew, Archaeology, passim.

[129]Marija Gimbutas, see reference 104.

[130]Renfrew, Archaeology.

[131]Sergent, p. 434.

[132]Gamkrelize – Ivanov, see reference 108.

[133]Sergent, p. 62-63.

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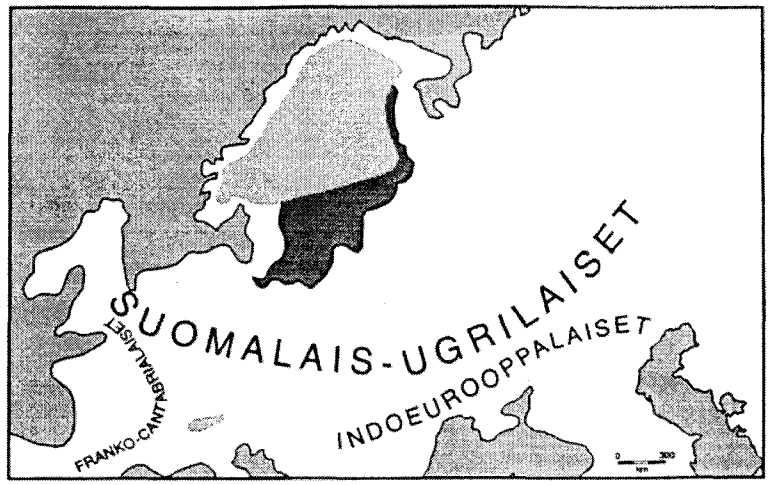

Map 3. A simplified map of Europe during the period of the Baltic Icelake and the North-Sea Land about 9000-10,000 years ago. Drawn by Jari Okkonen on Milton Nuñez's base map.

sized homeland view – has directed toward Renfrew's hypothesis: "In any event, we can note that over 10,000 years ago the still undifferentiated Indo-Europeans were a numerically small people who were neighbors of the Afro-Asiatic people in the Near East."[134]

It still seems more logical to me in light of the cohesiveness and contacts of the Indo-Europeans to argue for a smallish but chain-like homeland. This homeland would include the headwaters of both the Euphrates and the Tigris, territories between the Black Sea and the Caspian Sea and directly north of them including the Volga estuary, northern Anatolia, and possibly the Balkans and regions south of the Danube. In other words, the Indo-European homeland would have been located between the Finno-Ugric periglacial zone in the north and the Near Eastern Afro-Asiatic territory in the south.

These are the basic elements of the European playing ground, but not all of the elements. In the west, there were at least the people and language(s) of the Franco-Cantabrian territory of which only the Basque have survived, while the ancient Iberians, for example, have disappeared. The ancient Pictish in the north clearly survived from pre-Indo-European

[134]Sergent, p. 434.

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languages.[135] The Etruscan, the ancient Sicilian languages, and the debated Pelasgian in Greece continue to be problems and topics of debate.

Only Basque has survived from this group of non-Indo-European languages. Others have been assimilated into the Indo-European languages. It is possible that many other languages had disappeared such a long time ago that not even unquestionable substrates of them have survived in recent living languages. Therefore, it is entirely useless to even start speculating about them and their territories because it is impossible to profit thereby.

In the end, the only two non-Indo-European languages remaining in Europe are: the Caucasian languages spoken only in the Caucasus Mountains and the Basque language in the Pyrenees. The rest of Europe was left as the playing ground of the Indo-European and the Finno-Ugrian peoples and languages. Farming, which appears to have emerged primarily in Anatolia and adjacent territories, spread among the Indo-Europeans about 6000 BC along two routes. The western route (along which the wheat and barley spread) went from Anatolia to the Balkans, while the eastern route (also millet) went through the Caucasus and the Aral Sea before turning toward the west. As already mentioned, the spread of farming did not occur according to Ammerman and Cavalli-Sforza's "wave of advance" model, nor through Renfrew's migration model, but through a more complex process.

Marek Zvelebil[136] has developed a three-phase model of farming expansion: 1. The availability phase, 2. The substitution phase, 3. The consolidation phase. In general, Zvelebil's model appears to describe the process of farming expansion more accurately than the one proposed by Ammerman and Cavalli-Sforza and also the so-called pioneer hypotheses. If we consider

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[135]K. H. Jackson, The Pictish Language (The Problem of the Picts. Ed. By F.T. Wainwright. Toronto 1955), p. 151-52. About archaeology, see Stuart Piggot, The Archaeological Background (The Problem of the Picts). Piggot thinks that the roots of the ancient Picts derive from the Dogger Bank culture – that is the Maglemosian culture. See also Desmond Collins, Early Man (The Origins of Europe. Four New Studies in Archaeology and History. Ed. By D. Collins. London 1975).

[136]Marek Zvelebil, Mesolithic prelude and neolithic revolution (Hunters in Transition: Mesolithic societies of temporate Eurasia and their transition to farming. Ed. By Marek Zvelebil. Cambridge 1986), p. 12.

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that farming spread as described by this hypothesis, we must also take two factors into consideration. First, the farming spread from south in the loess soil region and fertile river banks (of central Europe), while other regions were still used by the hunter-gatherers. Second, we must also consider climatic changes, failing crops, as well as epidemics that could have resulted in temporary slow downs of the farming expansion.[137] As a result, the farming frontier advanced with an uneven rate like a German panzer division during the *Blitzkrieg* and the farming expansion made Europe an enormous jig-saw puzzle and playing ground.[138]

It is especially worth noting that it is a fact that islands of hunter-gatherers survived in this process. The newcomers' *lingua franca* (an Indo-European language form) did not conquer new territories suddenly, and because there were surviving pockets (of the indigenous people), there were also better chances for mixing of different languages. For instance, the Finno-Ugric substrates of the northern Indo-European languages (the Germanic and the Balto-Slavic languages) can be explained through this process.

It could be predicted that the further north the farming frontier advanced, the longer it took until the consolidation phase of Zvelebil's three-phase model was reached. We can actually find all three phases in Finland during the historical period. Therefore, this hypothesis proposed to explain events in prehistory can be proven with historical records.

If we study the history of farming in Finland over a long time interval, we notice that during the Middle Ages southernmost Finland was at the last (or third) consolidation phase, central Finland was in the substitution phase, and northern Finland in the availability phase. This process was extremely slow. Therefore, we cannot talk about any revolution, but about a sequence of events taking place during a millenium and a half. One must be aware that the consolidation phase was reached in

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[137]See, for example, George J. Armelagos, Alan H. Goodman and Kenneth H. Jacobs, The Origins of Agriculture. Population Growth During a Period of Declining Health (Population and Environment: Journal of Interdisciplinary Sciences 13/1991).

[138]Many other researchers of the early farming have arrived at similar results. See, for example, Peter I. Bogucki, Forest Farmers and Stockherders. Early Archaeology and its Consequences in North-Central Europe (New Studies in Archaeology. Ed. By C. Renfrew and J. Sabloff. Cambridge 1988).

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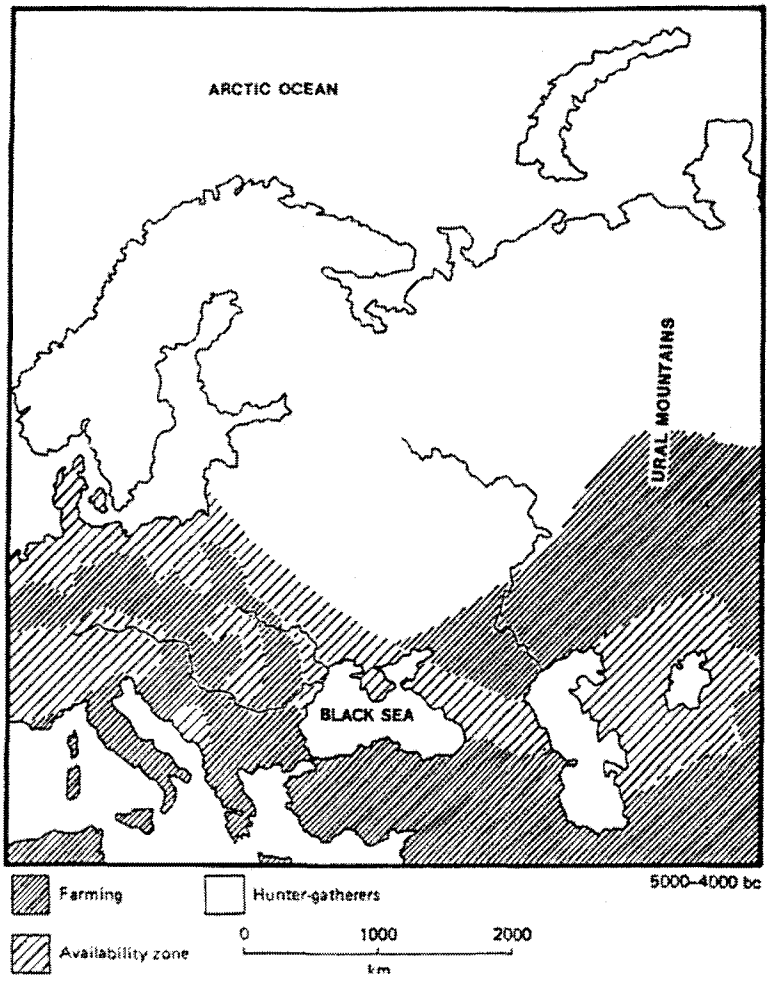

Map 4. The spread of farming as well as the Indo-European languages after Marek Zvelebil (Hunters in Transition, ed. By Marek Zvelebil. Cambridge 1986), p. 177. This map shows clearly how the farming first spread to the loess soils regions and the river valleys. The more remote and more mountainous regions were left in between. The hunter-gatherers of these regions became farmers gradually and apparently maintained their original languages for a rather long time, which largely explains substrates in many languages. The aboriginal languages survived long enough to have influence in these regions. This phenomenon occurred all over Europe. I thank Prof. Zvelebil most humbly for his permission to use this map, which is the best such map I know.

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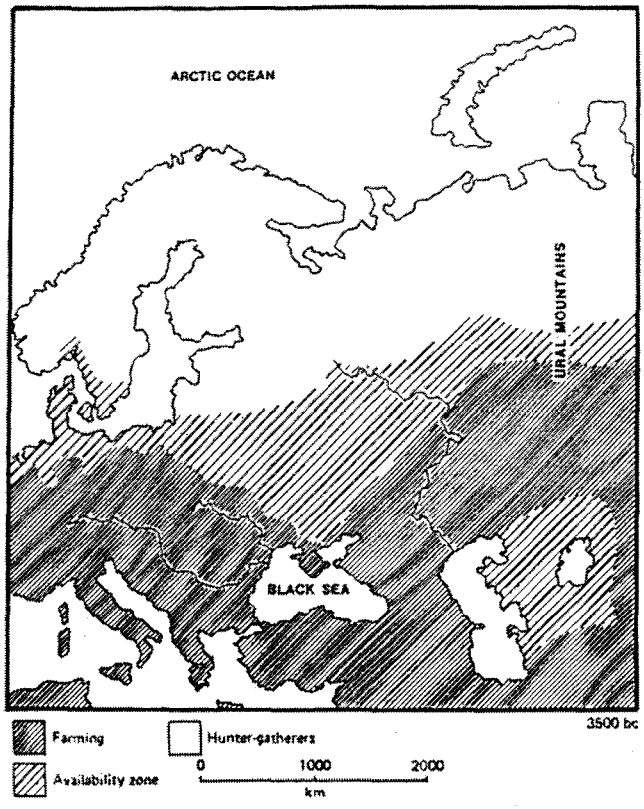

Map 5. The spread of farming as well as the Indo-European languages, after Marek Zvelebil (Hunters in Transition, ed. by Marek Zvelebil. Cambridge 1986), p. 178. I thank Prof. Zvelebil also for allowing me to use this map.

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southern Lapland as late as the 1800s. For these reasons, I have talked about the hunting peasant culture instead of the peasant farmer culture in other contexts, while actually referring to the same process than Zvelebil with his three-phase model.[139]

Every event is, of course, unique among historical events and there is no single model, and even less a law, to be found according to which the events take place. On the other hand, events are always tied to their biological and geographical realities. Therefore, one can assume that expansions, (population) movements, or even migrations of particular clans, tribes, and nations may largely resemble that of other such groups. For this reason, Finland's example may provide indicators of what really may have occurred in the ancient past elsewhere.

Since we now start with the idea that the Proto-Finno-Ugrians inhabited the broad periglacial zone during the Ice Age, we must at first note a few unquestionable facts. It appears that Europe became partially uninhabited during the last extremely cold period. There were, however, scattered locations where the human settlements concentrated during the very coldest period and from where the re-colonization started after ice sheets started to retreat. These regions were the Franco-Cantabria settlement concentration in the west and the settlement concentration in Ukraine and along the Danube in the east. One may assume that these centers of re-colonization were at least temporarily isolated from each other (possibly around 18 ky BP). After the glacial retreat, human settlements started to spread from these centers in all directions northward over territories that had become free of ice.

One must conclude, based on all of this information, that if one searches for the earliest Finno-Ugric homeland, this homeland must have been located along rivers in Ukraine and both south and southwest of them. There was a gradual shift of human settlements toward the northwest, north, and northeast after large game. The Urals continue to be a problem at this stage because the inhabited zone without sharp cultural boundaries derived from the Paleolithic Period extended to the Urals during the Mesolithic.

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[139]Kyösti Julku, The Hunting Peasant Class in Finnish Economic History and Prehistory (Abstract: European North: Interactio of Cultures in the Ancient Times and Middle Ages. Syktyvkar 1994; the same, manuscript (forthcoming).

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If our suggestions are correct, the map of Mesolithic Europe would show Finno-Ugrians occupying broad areas south of Scandinavia. It must be noted that I do not include the Black Sea coast as part of the Finno-Ugric settlement area. Furthermore, when one thinks of the later avalanche of Indo-Europeans over almost the entire extent of Europe, and how easily that was accomplished, one may ask whether Indo-Europeans were perhaps already in the area of the Danube during the Mesolithic. We may never be able to resolve the problem of the origin of the Finno-Ugrians and their relation to the Indo-Europeans conclusively, but the suggestion that Finno-Ugrians occupied a large portion of northern Europe prior to their displacement by Indo-Europeans is certainly worthy of consideration.

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BOOK REVIEW ARTICLE

IQ and the Wealth of Nations
Richard Lynn and Tatu Vanhanen
Praeger, Westport. Connecticut 2002
256 pp., U.S. $64.95, ISBN 0-275-97510-X

National Income, Intelligence, and Climate

Edward M. Miller[1]
University of New Orleans

Richard Lynn and Tatu Vanhanen in their *IQ and the Wealth of Nations* have exhibited great courage. Anyone who mentions that people or nations may differ in intelligence is denounced. Yet as many readers know, intelligence tests consistently show the races to differ in intelligence, and the evidence points strongly to genetic causes for these differences.

Yet, if the races differ in intelligence, and nations differ in racial composition, then the intelligence of nations may differ. Without ever mentioning the term race, it is this possibility that Lynn and Vanhanen explore. They make a good case that not only do nations differ in intelligence, but that these intelligence differences make a major contribution to national income differences.

One of the authors, Tatu Vanhanen, is a Finnish political scientist who has written on such subjects as democratization (which is one of the variables used in this study) and on ethnic conflict. The other, Richard Lynn, is a UK psychologist. He is probably the leading expert in international comparisons of intelligence (an earlier survey of national IQs in this journal is Lynn 1991a). Such comparisons are complex because there are a wide variety of tests that have been given at different times, to different groups (children, students, conscripts, etc.) and for different purposes (virtually never was the purpose to make international comparisons). To make these comparisons numerous adjustments must be made.

The situation is further complicated because there is evidence that intelligence scores have been increasing over time. This increase is sometimes referred to as the Lynn-Flynn effect

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in honor of the two authors who have drawn attention to it, one of which is a co-author of this book. Naturally, Lynn has adjusted the scores for the date of the tests. A major contribution of the book is a set of consistent estimates of national IQs. These estimates will probably be used by others to investigate various hypotheses and to expand on Lynn and Vanhanen's work. The book provides an appendix giving the sources for the IQ scores for each nation and the adjustments that have been made

Perhaps the first question to be addressed is whether the measurements of intelligence that have been made are sufficiently accurate to build an argument on. This is tested by locating 45 countries in which more than one test has been given. When more than two tests have been given, the two extreme values were used. The correlation of the two tests is .939. This correlation is high enough to establish that the tests are reliable.

The first finding of the book is that nations do indeed differ in IQ. The country scores were calculated on a scale in which the IQ of Britain is 100 and the standard deviation 15. There were 81 countries for which national IQ could be calculated (including Hong Kong and Puerto Rico as countries). The US scores 98 on this scale. The authors grouped these by region. The highest scores were not in Europe or the US, but in East Asia. The highest reported was 107 for Hong Kong, followed by 106 for Korea, 105 for Japan, 104 for Taiwan, and 100 for China (mainland).

The charge is frequently made that the nationals of the countries for which the test were designed will always do best. Virtually all of the IQ tests were devised in the UK or the US, but yet the highest scores were obtained in East Asia. The natives of the country where the tests were developed do not always do best. Lynn and others who work on differences in intelligence are frequently accused of being racists who believe in white superiority. Yet Lynn's data shows that the most intelligent nations are non-white.

Looking at other regions, European countries range from 102 (Germany, Austria, Italy, and the Netherlands) down to 90 for Croatia, 92 for Greece, and 93 for Ireland. The non-European English speaking countries range from 100 (New Zealand) to 97 for Canada, which is not surprising given that their populations predominantly originated in Europe.

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The populations of Latin America and the Caribbean exhibit a relatively wide range from 96 for Uruguay and Argentina down to 72 for Jamaica and 78 for Barbados. Eyeballing the data, the predominantly white countries appear to test higher than the countries with heavily American Indian or African derived populations.

While East Asia (predominantly Mongoloid) tests relatively highly, the populations of South Asia tend to test lower, ranging from 78 in Nepal and Qatar to 94 in Israel and 103 for Singapore. The Singapore population is predominantly of Chinese extraction and like other populations of East Asian extraction tests well. India scores 81. Southeast Asia and the Pacific Islands ranged from 84 to 89 (Indonesia).

The African countries ranged from 63 (Ethiopia) to 85 for Morocco and 83 for Egypt. All of the sub-Saharan African countries (the Negroid countries) test below 80.

Thus, one major finding is that nations do indeed differ in intelligence. The broadest pattern is that which Rushton (1995), working with data from single countries, has drawn attention to. Mongoloids of East Asia have the highest IQ and the Negroids of sub-Saharan Africa have the lowest, with the Caucasians in the middle. However, the pattern is far from this simple, and there is a wide range within the predominantly Caucasian nations from 102 in Germany on down to 81 for India.

The IQ data does appear to have a clinal pattern with adjacent nations having very similar scores (the few exceptions can often be explained by population movements within historical times). Indeed, estimates are prepared for virtually all nations with over 50,000 people on the basis of values for nearby nations (with adjustments for racial mix in a few cases). This procedure can be defended by the observation that adjacent nations tend to have similar scores.

For instance, the North African countries of Morocco and Egypt have scores that are in between those of sub-Saharan Africa and those in Europe, and Near Eastern scores tend to be between those in India and those in Europe, with scores gradually rising as one moves through Iran to Turkey and into Greece and the Balkans.

Of course, if a country's population is drawn from widely separated areas that differ in intelligence and there are few representatives from the intermediate area, describing the

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population in terms of distinct races that differ in appearance and intelligence will be accurate. This applies to the US where there were many European settlers and African slaves, but few from areas in between.

Having shown that nations differ in intelligence, the next question is does this correspond to anything of importance? Are they measuring anything beyond ability to solve problems set by psychologists? In the language of psychometrics, the question is whether the tests are valid. We would expect (and tests within a single country confirm) that more intelligent people would be expected to be better able to understand mathematics and science. Standardized achievement tests have been given to children in a large number of countries. The correlation between scores on these tests of mathematics and national IQ is .881, and between science scores and national IQ is .868. Both correlations are based on 38 countries. Given the importance of mathematics and science to modern technology, it would be expected that countries whose populations have high IQ would be technologically more advanced, and would have high incomes.

Not surprisingly, the major finding of the book is that national IQ and national income correlate. Results are presented for a number of measures of national income or product. Probably the best is gross national product adjusted for purchasing power parity (the local currency is converted to US dollars on the basis of purchasing power). For 1998 the correlation between national IQ and gross national product is .775 for the 65 countries for which the authors had both sets of data. Since gross national product data is available for more countries, it is useful to see how it varies with IQ. Indeed, it is available for all 81 countries for which we have IQ estimates. The correlation coefficient is .664. If we use gross domestic product, the correlation coefficient with IQ for the 81 countries rises to .733. These correlations are much too high to be due to chance.

Similar results are reported for income in earlier years. Income in 1820 and current national IQ correlate at .535. Similar results are found for the years between 1820 and today. It is also shown that the rate of growth of national income correlates with national IQ. Estimates are made of national IQ (from the scores from nearby countries) for the nations where

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tests have not been given, and correlations calculated. Similar results are obtained.

The data on national IQ does not fully explain all differences in national income. Lynn and Vanhanen also obtain quantitative indices of economic freedom and democratization. The latter index had been produced by Vanhanen himself. The index of economic freedom is really a measure of the extent of economic regulation (the communist countries come in at the bottom). While democratization and economic income correlate with each other, the measure of economic freedom correlates better with measures of national income. It is actually slightly more powerful than national IQ. When combined with national IQ it provides additional explanatory power. However, since the role of economic freedom has been extensively discussed elsewhere, it will not be further discussed here.

The finding that IQ and national income correlate will not surprise many. Correlation does not prove causation. It is possible that the causation runs from high levels of national income to high IQ levels. This could happen if education, good nutrition, or exposure to modern technology somehow raises IQ sufficiently. Thus, the typical anthropologist, journalist, or education professor would not be surprised to learn there was a correlation between national income and IQ test scores. They would merely assert that high incomes led to high IQ scores.

However, Lynn and Vanhanen clearly believe the causation runs from high IQ to national income. The differences in intelligence between nations reflect genetic differences. There are a number of reasons for these beliefs, most of which are given in introductory chapters on what is known about intelligence. The evidence points strongly to genetic causes for these differences. Perhaps the best documentation and discussion is in Jensen's (1998) book, *The g Factor* (summarized and reviewed in this journal in Miller, 1999). Other articles in this journal have summarized intelligence-related research (Miller, Spring 1995, Summer 1996). Most quantitative genetic studies show intelligence to have substantial heritability. Particularly persuasive are the studies of identical twins raised apart. The twins develop similar IQs in spite of substantial differences in their environments. There have also been studies of adopted children, who turn out to resemble little their adopted parents while resembling their biological parents.

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Conceivably, IQ is heavily affected by genetic differences within populations and nations, but the differences between populations are solely caused by environmental factors. However, this is highly implausible.

While many hold that IQ measures nothing fundamental, an interesting fact is that reaction time, as measured by the time needed to react to a light coming on and to decide to switch it off, correlates with IQ. These measurements have been made in several countries, consistently finding a positive correlation. Interestingly, when these countries are arranged in order of national IQ, the scores on various reaction time tests are in the same order (their Table 6.2). In spite of such data being available for only six countries, a positive and statistically significant relationship is obtained for IQ versus simple reaction time, IQ versus choice reaction time, IQ versus odd-man out reaction time, the variance of the simple reaction time, and the variance of the odd man out reaction time. These correlations indicate that the national differences in IQ are indeed are indeed due to biological differences between the brains of inhabitants of different countries. Nowhere are the citizens rehearsed on these reaction time tests, and nowhere are they taught in school.

Particularly persuasive that group differences in IQ are due to genetic factors are the studies of interracial adoption (Scarr & Weinberg, 1976; Weinberg, Scarr, & Waldman, 1992). Blacks adopted into white families have IQs closer to those of their biological parents than the IQs of white children (Levin 1994, Lynn 1994, Waldman, Weinberg, & Scarr, 1994). Mixed race children fall in between black and white levels. The only plausible explanation for these results is that there are genetic differences between the races in genes for intelligence.

Why Differences in National IQ

The book addresses climate and national development. Tabulating the data by location they document what others have noticed, that the incomes in the temperate regions are higher than in the tropics. Their table 9.1 shows the average GNP of the 97 countries in the Tropics was only $2,322. In contrast, the average GNP for 78 countries in the Northern Temperate Zone (north of the Tropic of Cancer) was $9,676. It was $6,517 for 10 countries in the South Temperate Zone (south of the Tropic of Capricorn).

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Some things about the tropics directly lower incomes, notably the tropical diseases, such as malaria. Lynn and Vanhanen however attribute the difference in income to the superior intelligence of the populations found in the temperate areas. The computed IQ levels were 92.4 for the North, 85.6 for the South, and 77.9 for the Tropics. The differences in prosperity are well known, but pointing out the difference in IQ has not been done before. As they note the climatic effect is stronger than implied by a comparison of tropical and non-tropical countries because several countries classified as being in the North, including India, Nepal, Pakistan, Egypt, and Morocco are on or near the Tropic of Cancer and have relatively low incomes and IQs. India in particular is usually considered a tropical country (although the northern portion and capital is north of the Tropic of Cancer).

The natural reaction is to wonder why the tropical populations have a lower IQ. In this book there is the comment that "we assume that differences in climatic and geographical conditions affected the evolution of human mental abilities in such a way that the average IQs are higher for the populations of temperate zones than for the populations of the tropics." (p165) As stated this explanation appears weak since it takes thousands of years for evolution to exert its effect on a population, and history shows many of the populations have not been in their present locations for long. Most of the New World, Australia, New Zealand, South Africa, Mauritius, the Seychelles, are occupied by people that evolved in other areas, frequently in Europe. However, when one examines the history of European settlement (as the authors note) one discovers that the European settlement was most successful in temperate areas including Canada, the United States, Argentina, Uruguay, Chile, southern Brazil, South Africa, Australia, and New Zealand. Tropical diseases discouraged European attempts to settle in tropical areas, and resulted in many of the attempts at settlement that were made being unsuccessful.

Thus, if we assign populations to the areas their descendants are known to have inhabited about 1492 we will find a relationship between temperate climates and IQ which will probably be even stronger than this book reports. This is because some tropical and sub-tropical areas have significant populations that are recent immigrants from regions further

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north (Europeans in Queensland, Florida, and Hawaii; Chinese in Southeast Asia). Some northern areas have significant numbers of tropical derived inhabitants (such as blacks in the US).

While Lynn and Vanhanen do not discuss the evolutionary forces that may have caused the populations evolving in the tropics to have lower intelligence (probably feeling this issue is peripheral to the main message of the book), Lynn (1991b) has elsewhere speculated on this issue. He argues that the frigid conditions in the non-tropical areas exerted selection for intelligence through failure of the less intelligent to survive. He points out that the hunting of large game in the colder area required cooperation and that intelligence contributed to this.

Elsewhere, I have discussed the climate based theory which purports to explain racial differences in many traits (Miller 1994). The basic point of "differential paternal investment theory" is that in the colder climates hunting large game was the primary source of food during the icy winters when most fruits, leaves, fish, and small animals are unavailable. Women, especially when pregnant or nursing, are very poor hunters. As a result, females and their children are dependent on male provisioning. In contrast, in tropical areas foods suitable for female gathering were available all year and male provisioning was less critical. In such tropical areas males were selected more for success at attracting females, not as much for the ability and willingness to provision them.

I later extended this (Miller 1995) to argue that where paternal provisioning was unimportant (in the tropics), mate selection could be based on visible traits that indicated good genes, such as health and strength. Since selection for these traits can be done by appearance (beauty, handsomeness) or simple observations of health, strength, and fighting ability, intelligence did not particularly help in picking a good mate.

However, where paternal provisioning was important (cold climates) intelligence was important in selecting mates. A male benefits from selecting women that will be faithful to him, and avoiding those that are unfaithful. Since a smart female will not make her unfaithfulness obvious, intelligence is often required (noting for instance who goes into the woods when she does). In choosing which children to provision, protect, or otherwise aid, it helps to be able to figure out which are biologically yours.

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Again intelligence helps in piecing together what has happened earlier, if anything.

On the female side, the female wishes to choose a male who will provision her. Since males can be expected to pretend loyalty and generosity, intelligence is useful to figure out who will be faithful, as well as how good they will be at provisioning.

Since it will sometimes be in the opposite sex's interest to be unfaithful (Hrdy, 1981, Symons, 1979), intelligence helps in cheating and in detecting cheating. If marriages are arranged or parents play a role, intelligence helps in selecting good matches. Finally, since intelligence is inherited, selecting mates with it will result in children more likely to be intelligent. Thus, intelligence becomes a desirable trait in a mate and one that will be regarded as 'sexy'. It is sought in a mate because it results in intelligent offspring that in turn will be considered desirable mates.

Thus, during hunter-gather times selection for intelligence was greatest in cold climates. With the coming of agriculture, the animal drawn plow became widely used in temperate areas. In these areas, the handling of the large animal that drew the plough required a male's courage and strength. Thus, the social system remained one where men played a major role in food providing. Having a male in the household remained critical for female reproductive success in cold areas, and determining whether your mate would remain faithful was critical. This required intelligence. In contrast, tropical areas retained a horticultural system of in which crops were grown without animal aid (for Africa this was probably because tsetse fly infection killed horses and other plough animals). Women used a simple digging stick to grow crops. It remained possible for women to feed children without male assistance. Men continued to emphasize mating effort over provisioning. In tropical areas it did not require as much intelligence to determine which of several potential mates would be best. Thus early patterns of differential selection for intelligence established in prehistoric periods would have continued into the agricultural era.

Admittedly, not all of the geographical differences in IQ are explained by the climate their ancestors evolved in. The Australian aboriginals do not test well even though most of them live in temperate climates. Likewise, American natives in the US appear to test below the scores achieved by the East Asian

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populations from which they are believed to be derived. The Lynn and Vanhanen data for the Americas show lower scores for the countries with a predominantly American native population, such as 79 for Guatemala, 90 for Peru, 87 for Mexico. Although some of these countries are in the tropics, the American natives are believed to be relatively recent arrivals from Siberia. There has probably not been adequate time for evolution to have produced large differences in New World IQ with latitude. In an earlier article in this journal (Miller 1997), I proposed to explain the lower IQs in the peripheral area of Australia and the Americas. The founding populations reached these areas before certain mutations that raise IQ had reached the homelands of these founding populations. With smaller populations than the Eurasian populations, these populations experienced fewer IQ raising mutations than in Eurasia.

Later this theory was generalized to geographic centrality theory (Miller 1996) in which the implications of the slow rates of gene diffusion were worked out. The available evidence is that there is not a single gene for intelligence, but many. If the original population that left Africa had lower IQs than current populations, the result would have been a widely diffused low IQ population ranging over Eurasia and Australia. It probably then encountered stronger selection for intelligence. However, calculations (Rouhani, 1989) show a single mutation under moderate selection for intelligence would not have had time to diffuse throughout that large area. Thus, we would expect the intelligence raising genes in different areas would differ. Thus, there were probably different intelligence increasing mutations occurring in different areas and gradually diffusing outward under selection (which was probably stronger in cold areas than in warmer areas). The peripheral areas would have been reached by relatively few of these diffusing mutations, especially if they were isolated by a water barrier (Australia and the Americas). In contrast, the more central areas could be reached by mutations arising in a wide range of areas, including the two extremes at each end of Eurasia. Genes could move relatively rapidly (especially after the domestication of the horse) across the plains of Eurasia. The result was a concentration of high IQ people in the lands from Japan to Great Britain.

It should be noted that Lynn and Vanhanen never use the term "race." However, it must be admitted that much of the

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explanatory power of IQ seems to arise from Caucasians and Mongoloids having higher IQs than other races and higher incomes. Yet one of the findings of the book is that high IQs are not uniformly distributed across the land inhabited by Mongoloids and Caucasians. While peoples from Indonesian and the Philippines are usually placed within the broad category of Mongoloids, their IQs of 89 and 86 respectively (as well as 91 for Thailand, 92 for Malaysia and 78 for Nepal) are far lower than the scores obtained for the further north Mongoloids in China (100), Hong Kong (107), Taiwan (104), Japan 105, and South Korea (106).

The Old World territory inhabited by Caucasians extends from India to Northwestern Europe and North Africa. It includes both the relatively high IQ area of Northwest Europe (IQs running around 100) and the lower IQ areas of India (81), the Middle East (Iran 84, Iraq 87, Lebanon 86, Turkey 90, Qatar 78) and North Africa (Egypt 83, Morocco 85). There does appear again to be a tendency for the warmer areas to be both lower IQ and poorer than the colder areas.

Thus the evidence for the proposition that high IQs lead to high national incomes seems to rest on more than racial differences.

Of course, since the Age of Discovery (starting say in 1492) there have been large population movements. It appears from the data in the book that the IQ of a country's population depends more on the latitude and climate of the population's ancestors than on its current latitude. Tropical Singapore shows an IQ of 103, which is well above the values for neighboring Malaysia (92) and Indonesia (89). The reason is probably that the population is predominantly from China where they had been subject to stronger selection for IQ.

Likewise, the countries whose populations are derived from the UK or countries close to it (New Zealand, Australia, Canada, US) have IQs close to the level of the UK (100). The US is slightly lower (98) because part of its population is derived from Africa and the New World. The IQs for Argentina (96) and Uruguay (96) are close to the IQ for Spain (97) from which much of the populations are derived. The IQs for the Caribbean Islands in the New World, countries whose populations are predominantly of African origin, Jamaica (72), and Barbados (78) are in the African range.

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In all of the above cases the level of national income and consumption of the populations derived from another part of the world resemble (admittedly not perfectly) the incomes and consumption that would be expected from the IQs of their populations.

Conclusions

Viewed from anthropology, psychology, or geography the contribution of Richard Lynn and Vanhanen has been to document that an important genetically influenced human characteristic, intelligence, varies among nations and human populations. They have also documented that this is a major determinant of national income. This is a major contribution.

It is now possible to start with the fact that the earth is round, deduce that different regions have different climates, some of which are cold, then deduce that in the cold climates that early females would require male provisioning. From here it can be deduced that the intelligence of the different regions would vary. Because favorable mutations would not have reached the more peripheral regions, one might predict that the highest IQs would be found in northern Eurasia. Populations in these areas would be the first to develop sea going ships and modern weapons. This would permit them to successfully colonize the less populated outlying areas of the Americas and Australia. Recognizing that high intelligence contributes to establishing and maintaining modern industrial economies, it can then be predicted that the northern regions (including those colonized from northern regions) will contain the highest income nations.

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Book Review

The Blank Slate: The Modern Denial of Human Nature
Steven Pinker
Allen Lane, 2002, 0-713-99256-5

John Locke famously compared the mind to "white paper void of all characters, without any ideas". He claimed that its contents were furnished by experience. *The Blank Slate* is in part a history of this beguiling theory. Because of its influence, whether in the form of behaviorism, cultural anthropology or historical materialism, social science has not done justice to genetic factors. Until recently that is. For according to Pinker a model of the mind is now being developed that acknowledges the importance of heredity as well as the environment.

Locke and his disciple John Stuart Mill were empiricists. They believed that human intelligence could be explained without recourse to the notion of innate organisation and they attributed all knowledge to experience. Behaviorism is a form of empiricism and it profoundly affected the social sciences of the last century, especially psychology. Indeed, according to a study carried out by Haggbloom (2002), B.F. Skinner was the most eminent psychologist of the last century. Because experience was all-important for the behaviorists, they blamed poverty and ignorance on defects in social institutions. A behaviorist could not have written *The Bell Curve.*

Professor Arthur Jensen (1998a) recalls that when he began to study psychology at Berkeley in the 1940's the influence of genes was completely ignored. The orthodox view in American psychology was that "...individual differences in the behavioral realm originated entirely outside the organism, through its exposure to different environmental contingencies..." B.F. Skinner maintained that studying the brain was misguided. Even Hans Eysenck, the doyen of the hereditarian London School thought that overt behavior was the only legitimate domain of psychology. Eysenck regarded Freudian theory as empirically unverifiable and he championed a form of therapy based on the learning theory of Pavlov and Skinner (Jensen, 2000).

Robert Plomin (1997) has constructed a pleasing diagram that illustrates the historical swings of the pendulum between nature and nurture. It shows an emphatic movement towards

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the latter in the 1950's. Evidently the Holocaust made the concept of human nature, not to mention eugenics and racial science, anathema in that decade. Yet as Pinker observes, state sponsored mass murder also took place under Marxist regimes that had an explicitly anti-innatist ideology. It is therefore hardly logical to disapprove of behavioral genetics or evolutionary theory because of their historical association with National Socialism. Nor are twin studies immoral because Dr. Joseph Mengele undertook them.

At the beginning of the 20th century the anthropologist Franz Boas elaborated what eventually became the standard social science model. Boas believed that differences between races and classes were cultural not biological. All ethnic groups were endowed with the same basic mental abilities, in his view. Although Boas regarded Western civilisation as superior, he thought that all peoples were capable of attaining it. Pearson (1993) has highlighted the pivotal position attained by Boas' disciples in American social science, in particular anthropology. "Boas created a monster", as Pinker colourfully puts it.

Like E.O. Wilson, Pinker supports the unification of knowledge or consilience. The wall dividing biology from culture must come down. But arguably Pinker exaggerates the egalitarianism of those who built this wall. The autonomy of culture was the founding principle not only of cultural anthropology but also of sociology. Comte and Durkheim, two of sociology's founding fathers, regarded society as *sui generis.* Indeed, Durkheim feared that if the pre-social features of the individual, namely his race and heredity, were considered by sociology it would "dissolve into psychology" (Lukes, 1973). Yet both Comte and Durkheim were conservatives who sought a secular basis for social order. If, as Pinker complains, social scientists have generally treated individuals as merely "indeterminate material" moulded by culture, this partly reflects the influence of the classical sociological tradition.

Science "deals strictly with what *is,* not with what anybody thinks *ought to be*" (Jensen, 2002). It follows that psychometric evidence of average race differences in IQ has absolutely no bearing on how an individual from a particular racial group should be treated. Political equality does not require complete biological equality. Similarly, scientists who observe that cannibalism, infanticide, rape, sibling conflict and slavery are

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rife in many species (including our own) are not condoning these phenomena. Unfortunately many commentators are unable to distinguish between a statement of fact and a statement of value. Worse still, some commentators deliberately ignore the distinction. As Pinker recalls, Messrs Gould, Kamin, Lewontin and Rose reacted to the findings of socio-biology with "fear and loathing", treating them as prescriptive and a threat to progressive ideals.

Pinker agrees with the biologist Robert Trivers that the critics of differential psychology and socio-biology justified wilful distortion and gross errors in logic when they conferred an advantage in political struggle. Thus, when Richard J. Herrnstein published his article "IQ" in *The Atlantic Monthly* in 1971, he was described as an enemy of the Black people. He received death threats and was prevented from lecturing. Yet Herrnstein had not mentioned the issue of race! Moreover, the thesis of "IQ" was incontrovertible, even "banal". Herrnstein simply pointed out that in Western society social status is increasingly determined by intelligence rather than by inherited wealth or other non-genetic factors. This tendency for modern society to be stratified along genetic lines has been compounded by the heritability of intelligence and assortative mating.

The author provides further telling examples of inapposite, politically motivated criticisms of recent science. When psychologist Paul Ekman upheld Darwin's suggestion that certain facial expressions are universal, Margaret Mead described his work as "a disgrace". When researchers Randy Thornhill and Craig Palmer suggested that rape might have been selected for, feminists roundly condemned them. And when biologist E.O. Wilson explained the ubiquitous significance of family ties in terms of inclusive fitness, the "socio-biology study group" set up by Lewontin and Gould complained that his work was tainted by eugenics, social Darwinism and racism. Not surprisingly Professor Wilson, an impeccable liberal, remains reluctant to comment on political issues.

The anthropologist Napoleon A. Chagnon (1996) recently challenged the view that violence is a monopoly of modern civilisation. Based on thirty years of observation of the Yanomamö, he reported that they engage in frequent warfare and that killers amongst them have more wives and offspring. Earlier observers had quite independently reached similar

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conclusions. But the myth of the noble savage dies hard and Chagnon was accused of inciting the violence he documented in order to justify an invasion of gold miners. Pinker suspects that the "ideology police" have to deny the biological roots of aggression because Blacks in the United States have much higher rates of violent crime than Whites or Asians.

Professor Pinker rebuts the stock criticisms of the behavioral sciences, to wit, reductionism and determinism. He reminds us that Dawkins (1976/1978) demolished the fallacy "that genetically inherited traits are by definition fixed and unmodifiable". *Apropos* man, Dawkins acknowledged the unprecedented importance of cultural transmission. He also suggested that a genetic predisposition to aggression does not make it inevitable or acceptable.

The less than perfect predictability of behaviour also belies the accusation that behavioral genetics is deterministic. As Pinker observes, identical twins raised together still exhibit differences in personality because of the effects of the non-shared environment. Similarly, Plomin and Petrill (1997) show that intelligence is not predetermined. They point out that half the variance in IQ scores is non-genetic in origin. And they emphasise the importance of environmental factors, especially when the environment is unfavourable. But social scientists will have to re-conceptualise non-genetic factors, in their view, because genes guide experience, a phenomenon called genotype-environment correlation. Thus a child will create a milieu that complements its genetic propensities.

In practice, the critics of the new sciences of man implicitly assume that all behaviors have identical probabilities of occurring. As Pinker observes, for Steven Rose and co., "Zero innateness is the only acceptable belief, and all departures from it are treated as equivalent". These self-styled "dialectical biologists" accept that *Homo sapiens* needed a relatively large body to support a brain capable of transmitting culture. This concession to biology aside, they continue to regard human identity as infinitely plastic and insist on the complete separation of biology and culture.

According to Pinker, opponents of the idea of human nature fear that it legitimises inequality and rampant individualism. Yet as long ago as 1893 Herbert Spencer criticised T.H. Huxley's "ridiculous assumption" that evolution is limited

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to the struggle for existence between individuals "under its ferocious aspects". Spencer had in mind the various forms of altruism and mutual aid found in nature (Jones, 1984). The evolutionary psychologists are currently rediscovering Spencer's theory that altruism, co-operation and morality are products of the amoral process of natural selection.

Yet if the concept of human nature is not inherently reactionary, as Singer (2001) points out it is hardly supportive of the traditional left. In Pinker's opinion, likewise, the failure of Chinese, French and Russian Revolutions was inevitable and is easily explained. For the revolutionaries overlooked the primacy of family life in all cultures; the universality of dominance, ethnocentrism and violence; the prevalence of self-deception; the perennial appeal of inheritance and nepotism; and the "venial love of fame" that encourages governments to undertake foreign adventures. Perhaps Pinker is unwise, however, to give modern democracy the imprimatur of evolutionary psychology. Arguably this is an example of the naturalistic fallacy that he criticises elsewhere.

Pinker rightly condemns the tactic of intimidation currently employed by the radical left. As he remarks, this "distorts scholarship" for researchers "need picketers outside their window like they need another hole in the head". A recent example of the successful use of this tactic was the decision by the Galton Institute not to publish papers by Arthur Jensen, Richard Lynn and other speakers following the disruption of its annual symposium in 1999.

It has been suggested that the "furious response" to Jensen's 1969 *Harvard Educational Review* article threatened the very existence of the "fledgling" discipline of behavioral genetics (Plomin and Petrill, 1997). It also doubtless discouraged scientists from studying ethnic or class differences. Yet despite the various attempts to suppress controversial research, Pinker believes that the counter-revolution in the social sciences predicted by Rushton (2000) is gathering pace. The heritability of intelligence, indeed of all behavioral traits, has been demonstrated. *Contra* Gould, there is an emerging consensus that g does exist and that it significantly influences life outcomes. According to Plomin and Petrill (1997), "the question is when, not whether, genes will be found that are associated with intelligence". Scientists such as Han G. Brunner

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(1996) are exploring the genetics of crime and sociopathy. And the twin studies carried out by Thomas Bouchard at Minnesota have overthrown the conventional wisdom about childrearing. It transpires that identical twins reared together end up no more alike than identical twins reared apart. Likewise adopted siblings brought up together are no more alike than any two people taken at random. Educational theorists have yet to address the mounting evidence that, partly for genetic reasons, children differ in their capacity to learn.

Another invidious consequence of the left-wing assault on reason and science is that some scholars say one thing in public but another in private. Judging by his equivocal comments on race differences, the author falls into this category. Pinker's avowed goal is to make the notion of human nature "respectable". Perhaps this explains his reluctance to acknowledge the significance of race.

Officially Pinker agrees with geneticist Steve Jones (1996) that racial group differences are largely adaptations to climate and are only skin deep. They are assumed to run deeper than they do, he maintains, because the parts of the body that face the elements are highly visible. In short, they are "a trick played on our intuitions". Granted, Pinker disputes the fashionable idea that race is a "social construct". Races with different distributions of gene frequencies exist, he remarks, because in the past geographical separation precluded random mating. But he concludes that the resulting population differences are "reassuringly" small and agrees (for once) with Lewontin that the differences within races are greater than those between them.

The author does not think that genetic race differences in intelligence should be dismissed *a priori*. But as regards the fifteen point average black-white IQ difference in the United States, he considers "...the current evidence does not call for a genetic explanation". Like Sowell (1994), he predicts that this Black IQ deficit will eventually disappear, as did some earlier IQ differentials between other ethnic groups in America. On this issue, if no other, Pinker prefers wishful thinking (what he elsewhere calls a "faith-based approach") rather than science.

It is also noteworthy that Pinker defers to Professor Jensen on the question of a possible sex difference in *g*. Unlike Richard Lynn, Jensen cannot detect one (Jensen, 1998b; Lynn, 1994).

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But Pinker disregards Jensen's conclusion that the average white-black difference in *g* has a biological component. Similarly, the author accepts Van Valen's finding of a correlation between brain size and intelligence. But he conspicuously fails to mention the evidence for race differences in brain size. Indeed, when it comes to race, Pinker is something of a sociologist manqué. Referring to crime and violence in the United States, he safely suggests that for Blacks in inner city neighbourhoods, toughness is the royal route to status.

It remains axiomatic in some circles that culture is everything, biology nothing. According to gender feminists, rape is driven not by lust but by the will to power and little boys only fight because they are encouraged to. As many as 40 human categories, including those of heterosexual, homosexual, race and woman have been characterised as social constructions. "Experts" on violence insist that it is entirely learned. Certain academics still dispute the existence of inborn, general ability and attribute Black educational under-achievement to "institutional racism" (Gillborn, 2002). And Marxists continue to proclaim that human nature is malleable and that self-interested motivations could be eradicated. These various manifestations of blank slate thinking look increasingly tenuous.

His disingenuous exegesis of race and intelligence notwithstanding, Pinker's new book is a welcome résumé of the latest thinking in behavioral genetics, cognitive neuroscience and evolutionary psychology. As Professor Rushton (2002) remarks, "This book sweeps Blank Slate orthodoxy into the dustbin of history. One only wishes Pinker had used a wider and stiffer broom".

L.C. Jones

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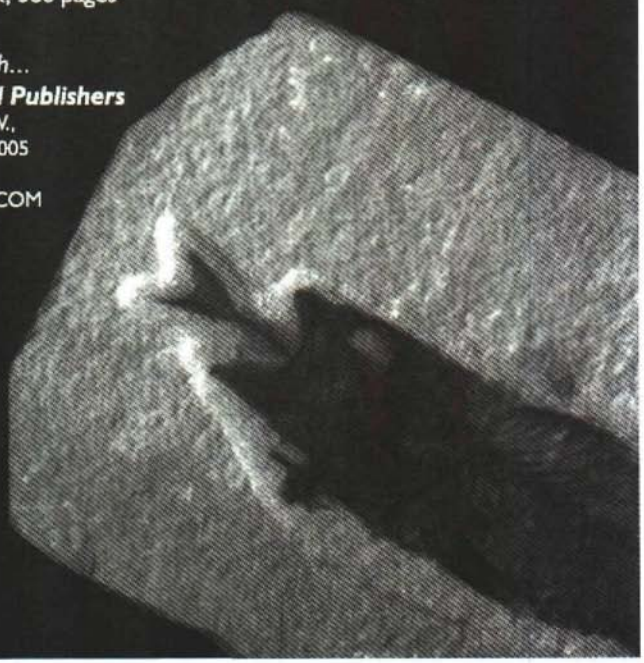

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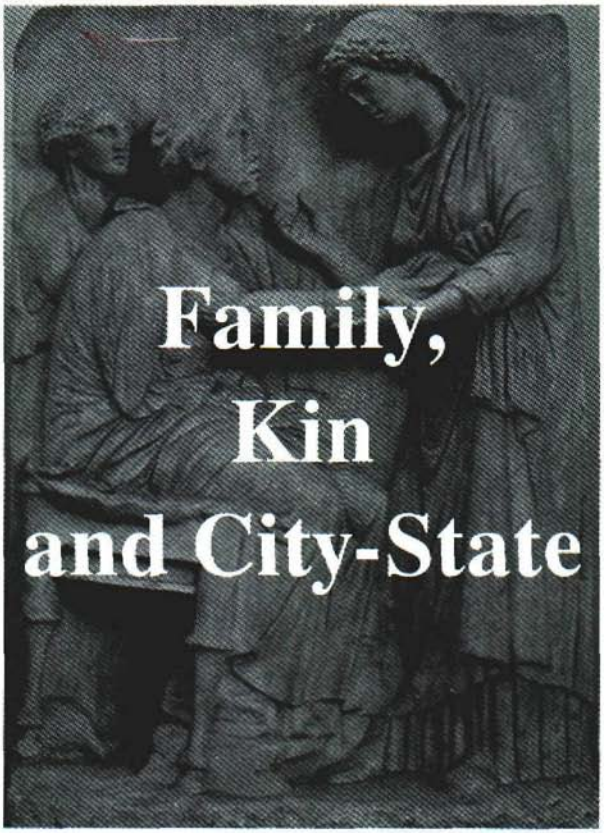

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